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The Relations of John Caius With Andreas Vesalius and Some Incidental Remarks on the Giunta Galen and on Thomas Geminus

CHARLES DONALD O'MALLEY*

JOHN Caius was a man of many merits. He was distinguished as the second founder of Gonville and Caius College, as annalist and president of the College of Physicians in London, as doctor of medicine, philologist, antiquarian, and zoologist; and in an unusual tribute his writings, at least in part, received the attention and royal approval of James I—"Give me rather Caius' *De canibus.*"[1]

This man of many parts and varied activities was born in Norwich on 6 October 1510. He entered Gonville Hall, Cambridge, 12 September 1529, where he acquired knowledge of the liberal arts and began the acquisition of an unusually sound knowledge of Greek and Latin and a strong interest in antiquities. He graduated B.A. in January 1532-33 and commenced M.A. in 1535. Despite an earlier concern with theology, Caius shifted his interest finally to medicine, and in 1539 he left England for Padua to pursue the subject in the distinguished medical school of that Italian city, "as a young man . . . and in Italy for the sake of my training." Thereafter on 13 May 1541 he received his M.D. degree, *artium et medicinae doctor.*[2]

The university records for that period no longer exist, but in his account of the university Antonio Riccoboni (1541-1599), one-time professor of eloquence at Padua, lists in chronological sequence at least some of the holders of professorships, and in his introduction to this list he states that he has inscribed such names and dates as "they were read by me" in the university records. According to Riccoboni's account[3] Caius may have had as his teachers between 1539 and 1541 any or all of the following:

* Department of History, Stanford University, California.

1 Thomas Fuller, *The worthies of England,* "Norwich."

2 *The works of John Caius, M.D. With a memoir of his life by John Venn* (Cambridge, 1912), pp. 1-6. There is separate pagination for the memoir as well as for the writings of Caius incorporated in these *Works.*

3 Riccobonus, *De gymnasio Patavino,* in Graevius, *Antiquitates Italiae,* VI, pt. iv, cols. 25-7, 29.

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Theory of medicine, Professors in ordinary: Oddus de Oddis of Padua, 1539-40, Franciscus Cassianus, 1540, Pamphilus Montius of Bologna, 1541. Professors extraordinary: Franciscus Cyrochus of Foligno, 1539, Hieronymus Balneus of Bergamo, 1540, Josephus Salandrus of Bergamo and Julius Conradinus of Padua, 1541.

Practice of medicine, Professor in ordinary: Joannes Baptista Montanus, 1540-41.

Surgery, Professor in ordinary: Andreas Vesalius of Brussels, 1539-41.

On the third book of Avicenna: Octavianus Thomasinus à S. Agatha and Alphonsus Lucanus of Amalfi, 1539, Antonius Secundus of Bari and Josephus Salandrus of Bergamo, 1540, Robertus Robertinus of Brescia and Franciscus Manfredus of Cremona, 1541.

However, Caius mentions specifically as his teachers in Padua only two men: Joannes Baptista Montanus, "my preceptor in medicine . . . from whom . . . I learned much,"[4] and Paulus Crassus "one of my preceptors in medicine."[5] While Crassus is not on Riccoboni's list of professors—admittedly incomplete—during the period of Caius' study, other evidence suggests that Crassus taught medicine during that time, and it may be that Caius also profitted from the formal instruction of Victor Trincavellius[6] whom, however, he mentions in another capacity. Nor should the possibility be overlooked that he received instruction from Simon Arborsellus, doctor of medicine and vice-rector of the university, who

[4] Caius, *De libris propriis,* in the *Works,* p. 75. Joannes Baptista Montanus, or Giovanni Battista da Monte, was born in Verona in 1498 and died in Padua in 1551. After studies at Padua, he practised for a short time in Brescia whence he journeyed to Sicily and upon his return continued his studies in Naples. Thereafter he taught at Naples, Ferrara, and at Padua where he gained great renown and gave considerable impetus to the study and teaching of clinical medicine. Montanus wrote extensively on Galen and Hippocrates and what may be termed general medicine, although most of these writings were published posthumously. Cf. Scipione Maffei, *Verona illustrata,* III, pt. iia (Milan, 1825), 318; Giuseppe Cervetto, *Di Giambatista da Monte e della medicina italiana nel secolo XVI* (Verona, 1839); Pier Andrea Saccardo, "La botanica in Italia," *Memorie del R. Istituto Veneto di Scienze, Lettere ed Arti,* XXV, n. 4, XXVI, n. 6 (Venice, 1895, 1901); Francesco Pellegrini, *La clinica medica padovana attraverso i secoli* (Verona, 1939), p. 81 ff.

[5] *De libris propriis,* p. 76. Junius Paulus Crassus, or de Crassis, of Padua, although never elevated to one of the first chairs of the university, nevertheless was said to have merited such honor. There is record of his teaching moral philosophy in 1529, and some years later he was given the second chair as professor extraordinary of the practice of medicine. In the years 1544 to 1548 he took the place of Franciscus Frigimelica who was ill, and in 1549 he took over the second chair as professor in ordinary of the theory of medicine. He held this chair until his death in 1574 at which time he is said to have been over seventy years old. He published a Latin translation of the *Anatomia* of Protospatharius as well as various Latin versions of Areteus, Rufus of Ephesus, and Galen. Cf. Nicolas Papadopolus, *Historia gymnasii Patavini,* I (Venice, 1726), pp. 322-323.

[6] Victor Trincavellius, or Vettore Trincavello, was born in Venice *ca.* 1491. He received his M.D., possibly from Padua, although there appears to be some doubt about this, and after an academic career in Venice obtained the first chair of the practice of medicine at Padua in 1541 which he retained until his death in 1563. He was a prolific writer in the Galenical tradition. Cf. Giovanni degli Agostini, *Notizie istorico-critiche intorno la vita, e le opere degli scrittori viniziani,* II (Venice, 1754), pp. 529-548.

signed Caius' certificate of matriculation in June 1541,[7] as well as from all the doctors of medicine mentioned in Caius' doctoral diploma, of whom we know definitely, by his own testimony, that at least one was his teacher: ". . . the very famous and excellent doctor of arts and of medicine, Master Junius Paulus Crassus, citizen of Padua, his [i.e., Caius'] promotor in medicine, on his own behalf and that of the very famous doctors of arts and of medicine, Masters Hieronymous Urbinus,[8] Odo de Odis,[9] Franciscus Frizimelega,[10] Ludovicus Pasinus,[11] citizens of Padua and co-promotors."

During eight months of this period of study Caius and Andreas Vesalius occupied lodgings in common. "Andreas Vesalius who lived with me for eight months in common in a house in Padua, that is, Casa de gli valli, or, as the Paduans call it, Ca valle, near

7 Venn, *op. cit.*, p. 55. Almost no information appears to be available concerning Simon Arborsellus except that he was the author of a small book of eight leaves merely entitled *Angelo Fortio S.P.D.*, and probably published *ca.* 1545, in which he makes the following interesting comment, f.A4 recto: ". . . observe how unsure is the course of physicians, on the one hand turning their attention to simples and to compound medicaments; and, by the gods, to anyone reading their writings how many and great promises are offered for curing all the ailments—let it be understood literally—which I have mentioned above. However, when I arrived at actual practice, in order to recognize whether or not there were as many results as there had been promises, the truth of the matter is that I discovered few, and in a good many cases the matter would certainly have been handled better by nature, as Andreas, the learned anatomist and surgeon of Padua, once said to me in the course of an explanation when we were discussing these things and joking with our medical acquaintances and proposing to them that our art is of little value if they had nothing more effective for expelling infirmities. In reply to me they went back, as I may say, to the usual argument to the effect that they treat those things which are sound but leave solely to prognostics those which are mortal, as was taught by the master of the art himself. In reply I inquired if it would not be better to leave those matters to nature alone since she, as we see, drives out ailments better if nothing is employed. I beseech you to forebear in such cases, for those operations of yours are nothing except harmful rather than healthful deceptions, whence I once propounded this problem for them: why is it, I asked, that those who receive a head injury in Verona, no matter how slight, cannot be cured, and the unfortunate patient, forsaken by the physicians, dies miserably, but, as I have often seen, he is cured in Padua and Venice."

8 The writer has thus far been unable to locate any information regarding Hieronymus Urbinus, or Girolamo Urbino.

9 Odo de Odis was born in Padua in 1478 and studied letters and medicine there. Later he taught for some time in Padua and then in Venice whence he was recalled to Padua and remained until his death in 1558. He was particularly renowned for his exposition of Galen and was even termed the "spirit of Galen," a title which he accepted with great pleasure. His writings are represented by commentaries on Hippocrates, Galen, and Avicenna as well as a book on the pest and one on diet. Cf. *Papadopolus, op. cit.*, I, p. 313.

10 Franciscus Frizimelega, or Frigimelica, was born in 1491. He was to be found teaching the theory of medicine at Padua in 1533, whence he went to Venice. From there he was called to Rome to serve as a papal physician to Julius III and was retained in papal service by Marcellus II and Paul IV. Upon his return to Padua, where he was enticed by an increased stipend, he became professor in ordinary of the practice of medicine, a position which he retained until his death in 1559. Cf. *Papadopolus, op. cit.*, I, pp. 313-314.

11 Ludovicus Pasinus of Padua taught philosophy and medicine so successfully in Padua that his renown in time spread throughout Italy. He wrote little, a treatise on the baths of Padua and a consilium on the epidemic of Venice in 1556. He died in 1557, reputedly an octogenarian. Cf. *Papadopolus, op. cit.*, I, p. 311.

the Ponte delle paglia—during which time he wrote and illustrated his books *De humani corporis fabrica.*"[12] Caius also remarks that it was during this time that both he and Vesalius were occupied with the review of Galenical texts, in the case of Vesalius for inclusion in the Giunta edition of Galen's *Opera omnia,* 1541-42. Since Vesalius' contributions to that edition were published in the volumes appearing in 1541, it is likely that Caius' reference to his common dwelling with Vesalius refers to an eight months' period in 1540. In turn, this indicates that Vesalius was at work on the *Fabrica* in that year, and most likely even earlier and certainly later. Furthermore, Caius' use of the term "illustrated" (*depinxit*) is especially interesting, suggesting that Vesalius himself may have made some of the drawings although, of course, not the great ones which were the work of some genius unidentified today who had most likely been summoned to Padua from Titian's studio in nearby Venice. In view of the fact that the books of the *Fabrica* were written in numerical sequence it is entirely possible that during this period of common dwelling Caius was witness to the preparation of the celebrated drawings of the "muscle-men" which Vesalius describes as follows:

> When I conduct the dissection of a man myself, I usually draw a strong cord under the lower jaw and through each zygomatic arch to the vertex of the head, tied like a noose and either more toward the forehead or the occiput depending upon whether I have it in mind to suspend the cadaver with the head erect or depressed. I place the longer end of the noose across a pulley fixed to a beam of the room, and by it I draw the suspended corpse now higher now lower, taking care that it may be turned in every direction according to the requirements of the task. And when I desire, I am able to rest it on a table, for a table can easily be moved to the location of the pulley. In this way the cadaver was suspended for the delineation of all the plates of the muscles, as, for example, for the seventh plate . . . , although in that delineation the rope was twisted back to the occiput for the sake of the muscles which are conspicuous there in the neck.[13]

At some time during his years in Padua Caius was for a short time not only a student but a member of the faculty as well, a considerable honor due no doubt to his excellent grounding in classical philosophy and philology. As *Explicatores Sophisticae* for the year 1540 Riccoboni lists "Joannes Gavius of Britain [and] Realdus Columbus of Cremona."[14] Venn in his memoir of Caius writes that "shortly before [13 May 1541] he had been appointed

[12] Caius, *De libris propriis,* pp. 75-76.
[13] *Fabrica* (1543), p. 268 misnumbered as 266.
[14] Riccobonus, *op. cit.,* col. 31.

to a professorship there . . . he lectured on the Logic and Philosophy of Aristotle in the original Greek."[15] However, in Caius' own words the time appears to have been somewhat later: "In the year 1543, and contemporaneously with Realdus Columbus, having discharged the public office of lecturing on Aristotelian logic in Greek, for which I had been employed by the illustrious Venetians in the schools of S. Biago at Padua, for the schools of the arts in the Foro del Bo had not yet been completed."[16] From this remark it seems more likely that the appointment was, at the earliest, for the academic year from October 1541 to July 1542 or possibly, since Caius left Padua in July 1543, for the year 1542-43. There is a brief testimonial to the acquaintance of Caius and Columbus in the latter's *De re anatomica:* "Thrice I have found [the membrane of the hymen], twice in two little girls, and again in an older one when there were present, while I was dissecting, the very excellent Antonius Fracanzanus of Vicenzo and Paulus Crassus of Padua as well as John Caius the Englishman."[17]

Caius' appointment, whatever the year may have been, is of significance because it indicates the training which had prepared him for the position and also those personal interests which led him to accept it and thereby helps to explain his relations with Vesalius and things Vesalian. Caius was by training and inclination a conservative. He had a life-long interest in the past which led him, for example, to look into the history of his native city of Norwich and also of Cambridge. He spoke and wrote in favor of

[15] Venn, *op. cit.*, p. 6.

[16] Caius, *De libris propriis*, p. 86. In his *De antiquitate Cantabrigiensis Academiae* (p. 147), Caius gives us a little more information on the situation of the university at the time of his residence in Padua: "When I first went to Italy the lectures on the liberal arts in Padua were given in the somewhat humble and obscure dwelling of a certain Paduan citizen at S. Biago. However, before my departure other more magnificent schools had been built at the expense of the Venetian Senate which controlled the city, in the Foro del Bo near the school of jurisprudence which were the only buildings the university possessed, and the quarters of the students were as yet in the homes of the townspeople." These remarks may be explained by saying that in the early years of the university the professors were obliged to pay the rent for the necessary class-room space from their salaries. This practice continued until 1433 and resulted in the schools being scattered throughout the city, although certain areas appear to have been favored, among them S. Biago (Antonio Favaro, *L'università di Padova* [Venice, 1922], p. 15). In 1493 the school of law had moved to a building which had been a large inn known as the "Hospitium Bovis" and which was now renamed "Sapientia." The new and more elaborate name did not gain favor and the school was commonly known by the former name of the building, "At the sign of the ox," while the cluster of surrounding schools were called the *Scholae Bovinae*. As a result of long usage the name *Bovis* was commonly applied to the entire university. The proprietor of the inn, one Jacopo Bonzanini, granted it to the university on a ground lease, and although the original purpose was to provide a home for the law school, in 1522 it was decided that the school of arts should also be housed in the same locality. To this end the adjoining buildings were obtained in 1542 and 1546, and thereby the available space doubled (*Ibidem*, pp. 36-37).

[17] Columbus, *De re anatomica*, Lib. XIV.

the old and by then archaic pronunciation of the classical tongues, and he had little patience with what he termed "the new persuasion in religion"—in fact, it appears to have been more Caius' religious conservatism, as contrasted with theological conviction, which in later years led to his virtual expulsion from the college which he had so generously refounded at Cambridge.[18] In respect to the classical writers—especially Hippocrates and Galen, and with greater emphasis upon the latter—he presented a strong contrast to his erstwhile friend and fellow-lodger Vesalius.

Vesalius was inevitably a follower and admirer of Galen, although his admiration was in some degree limited by a comparison of the Galenical text with anatomical findings in the human cadaver. This may be expressed briefly by saying that Vesalius recognized the possibility of error in Galen. On the other hand, Caius considered Galen as faultless and believed that if demonstrable error appeared in a Galenical text it represented a faulty Greek manuscript or a faulty translation into Latin, a view which, at any rate, is more plausible than the conservative stand of Jacobus Sylvius who maintained that human variation from the Galenical description represented a degradation in the human species. Despite the fact that Caius was of the generation of Vesalius when the dissection of human anatomical specimens was under way and the scientific treatment of antomy had begun, he belonged spiritually to that previous generation in which the medical humanists had believed that Galen held the key to all medical problems and that accurate Latin translations from sound Greek texts represented the greatest boon they could offer to the medical world. The result of such an attitude was that Caius was to spend a considerable part of his time and energy in the coming years seeking out texts, collating and publishing them both in the original Greek and in translation.

Obviously, such a staunch defender of Galen could not possibly remain on terms of amity with a critic of Galen such as Vesalius. It is, therefore, only infrequently that Caius makes any further mention of the great anatomist and then chiefly in critical terms. On the other hand, as one might expect, Caius' friends were to be those of a similar frame of mind, the classically minded physicians and philologists. An instance of this attitude is to be found in the following quotation from Caius:

[18] Venn, *op. cit.*, pp. 37-38.

The occasion of the correction of the *De sanitate tuenda* was as follows. Henry Knolles, an Englishman well known and allied to me in all things when we were together at Padua, easily prevailed on me, because of our friendship, to read the Greek text of Galen's *De sanitate tuenda* to him. So that I might make the book more correct for him, I employed as much diligence as possible. He, however, as the man was human and that he might strengthen more in his memory all things which he had heard, was reading to the Italians at noon that which I had read to him in the morning, certainly to the great satisfaction of all. Thus although I had satisfied that man who was more inclined to humane letters, yet I, zealous for medicine, was not yet satisfied. For everything was spotted with errors. Wherefore seeking manuscript copies everywhere, not only among the Italians but also among the English when I returned, of whom John Clements and George Owen, outstanding physicians, offered two, I sought carefully to emend everything as much as possible.[19]

Caius makes one further reference to his life and acquaintances in Padua, and it is interesting to note that he had ceased to live with Vesalius and makes no reference to him. Presumably he had now found more congenial companions:

When I was studying letters in Padua and lecturing publicly in Greek on the logic of Aristotle, there were three of us who lived in the same house. One from Como, enjoyed only bitter and acid things; the second, from Milan, never drank wine but only hot water, nor did he feed on anything but biscuit; the third [presumably Caius] took only sweet things.[20]

The first of Caius' medico-philological activities was undertaken during that period when he was living in common with Vesalius.

I wrote the *De methodo medendi* according to the opinion of Galen and Joannes Baptista Montanus. . . . In writing those books I followed the leadership of those men just as Galen and Celsus followed Hippocrates; Oribasius and Paul [of Aegineta], Galen . . . not transcribing each detail but transfering whole theories of things, squeezing the blood and marrow from the words, just as the nut from its shell, and afterwards explaining everything according to our method of paraphrase . . . we shall not attempt to deny that our books *De methodo medendi* breathe Galen and Montanus.[21]

Contemporaneously Caius was preparing editions of some of Galen's writings for a publication which appeared in 1544, and it so happened that his fellow-lodger Vesalius was editing a Latin version of the *De anatomicis administrandis* for the Giunta edition while Caius was preparing the Greek text of the same work for his personal publication. A difference of opinion over the correct Greek text may have helped to produce the rift between the two

[19] Caius, *De libris propriis*, p. 83.
[20] Caius, *De ephemera britannica*, p. 91.
[21] Caius, *De libris propriis*, pp. 73-74.

men, and when Caius recalls the incident in his *De libris propriis* in 1570, the clarity of his recollection of what had occurred thirty years before suggests the strength of the arguments which had left so vivid an impression upon his memory.

If the Giunta edition of Galen's works was the immediate cause of the rift between Caius and Vesalius, it also had an influence of far greater proportion upon medicine in the sixteenth and seventeenth centuries, and since very little has been written about this publication it may not be amiss to give some attention to it. The Giunta family, originally established in Florence, in the person of Lucantonio Giunta removed to Venice around 1480 and established a publishing and bookselling business. Later, in 1503, Lucantonio undertook to print as well as to publish, and the most important of all the Giunta publications were the successive editions of Galen's *Opera omnia.* The first two editions, 1522 and 1528, appear to have been little more than careful reprints of the fourth edition of Galen published in Pavia, 1515-16, although the second Giunta edition of 1528 was slightly augmented.[22] These Latin translations of Galen, a necessity for the physician of that time, seem to have been a financial success, and Lucantonio appears to have determined not only to continue the venture but so to improve the next edition that competition would be obviated. Caius expresses this by remarking that "In those days honest rivalry intervened between Antonio Giunta, Augustinus Richus and Victor Trincavellius over the more correct Latin edition of Galen's complete works."[23] The new edition which was planned required revision of older, faulty translations or completely new renderings by competent scholars, mostly what we may describe as scholar-physicians. Some effort was made—although exactly how much it is impossible to say—to collate more manuscripts of the Greek texts, as Caius indicates, in order to improve the Latin versions, and even to add hitherto unprinted works. Referring to the

22 Renouard. *Annales de l'imprimerie des Aldes* (Paris, 1834), pp. vi-viii, 73, 91, 124, 141.

23 Caius is here referring to the competing Latin editions of Galen's *Opera omnia* of Lucantonio Giunta, already mentioned, and that of Augustinus Richus and Victor Trincavellius, *Galeni operum omnium sectio prima* [*-octava*], Venice, 1541-45. 10 vols. Augustinus Richus or Agostino Ricchi, was both a playwright and physician. He was born in Lucca, 1512. As a dramatist he is best known for his comedy *I tre tiranni,* produced for the coronation of Charles V. As a physician he practised in various Italian cities and from 1552 onward was physician to Julius III and his successors until his death in 1564. Cf. V. Bongi, "Agostino Ricchi e la commedia de' *Tre tiranni,*" *Propugnatore,* n.s.VI, p. 31 ff., and the brief article by Mario Pelaez in the *Enciclopedia Italiana,* XXIX, 242. On Victor Trincavellius, see above.

revision of the Latin text by Vesalius of the *De anatomicis administrandis,* Caius writes:

> For the correction of that book a few Greek notes turned up in an old Greek book in the possession of the Giunta family. They were transcribed by Augustinus Gadaldinus, certainly an affable and learned man and at that time superintendent of the printing establishment of the Giuntas, and sent to Andreas Vesalius . . . so that he might emend the Latin anatomical writings of Galen from them.[24]

Gadaldinus[25] was apparently editor-in-chief while Joannes Baptista Montanus worked out the organization of the individual writings according to subject and possible authenticity. The two men presumably had the authority to choose the editors and translators of the individual works.

Lucantonio Giunta, the instigator of this ambitious project died in 1537 or 1538 before its completion, and the task continued mainly under the direction of Thomas, one of his three sons, with the publication achieved in 1541-42: *Galeni omnia opera nunc primum in unum corpus redacta: quorum alia nunquam antea latinitate donata fuerant, alia aut novis interpretationibus, aut accuratis recognitionibus sunt illustrata: singula summo studio excusa, atque manuscriptis Graecorum voluminibus infinitis pene locis restituta. . . . Cum Decreto Summi Pont. Senatusque Veneti per annos vx. prout folio viii legitur. Apud haeredes Lucaeantonij Iuntae Florentini Venetiis M.D.XLI.* (All the works of Galen now for the first time gathered into one body, some of them never before translated into Latin, while others have been presented in

[24] Caius, *De libris propriis,* pp. 75-6.

[25] Augustinus Gadaldinus was born in Modena, 15 March 1515, son of Antonio Gadaldino, a distinguished bookseller and publisher whose long life continued until 6 April 1568 and whose publishing business appears to have been carried on by a second son, Cornelio, until his death *ca.* 1573. Augustinus studied medicine, probably in Ferrara, whence he appears to have gone to Venice. There is a letter (1543) written to him by Jacopo Bonfadio which speaks of their acquaintance during many years in Ferrara and continues to the effect that Augustinus was summoned by Tommaso Giunta, "the richest and most famous book dealer in the world," to take charge of his publishing business, and "in a short time displayed his ability through his editing of the works of Galen." This, of course, is a reference to the Giunta Galen of which Augustinus himself speaks in his letter. Bonfadio remarks further that Augustinus "being highly esteemed by the very benevolent Senators, was the principal means by which the excellent Fallopius and Sigonia were invited . . . to teach in the flourishing university of Padua and Venice." Augustinus also developed a friendship with Pietro Aretino, of which three letters (1545, 1548, 1550) survive, in the last of which Aretino accepts the excuses of Gadaldinus for not having been able to attend him during an illness, and in another letter of Aretino to Andrea da Perugia (1548) mention is made of the abilities of "the excellent Doctor Agostino da Modena" in the care of the sick, while there are other complimentary expressions regarding him in the writings of Mercuriale, Fallopius, and elsewhere. The literary efforts of Gadaldinus, although extensive, were largely confined to editing and translating the works of Hippocrates and Galen. He died in Venice in 1575, possibly of the plague. Cf. Tiraboschi, *Biblioteca Modenese,* II (Modena, 1782), pp. 371-76.

new or more accurate translations. Individually edited with the greatest care and restored in almost innumerable readings from Greek manuscripts. . . . With [exclusive] permission of the Pope and the Venetian Senate for 15 years as may be read on folio viii. By the heirs of Lucantonio Giunta of Florence. Venice, 1541.) The financial success of the new venture may be estimated from the reprint of the edition by Froben (Basel, 1542), possibly undertaken to ease the problem of distribution of the heavy folio volumes, and from the numerous later Venetian editions. For some unknown reason, however, only the original Giunta edition of 1541-42 contains the important and revealing letter of Augustinus Gadaldinus[26] which is here translated in part.

Augustinus Gadaldinus of Modena to Students of Medicine

From many instances it is possible to appreciate how great have always been the efforts of Lucantonio Giunta and his sons for the advantage of studious mankind; however, there is nothing whence we may perceive this better and more clearly than today when they have especially displayed the greatest magnanimity by seeking to publish and to bring to light in Latin all the works of Galen. . . . Joannes Baptista Montanus of Verona, who at present professes medicine in the University of Padua, to the greatest admiration and applause of all, . . . in a letter, as you have already seen, and as you will also observe again in this work, very clearly demonstrated what order ought to be observed in the reading as well as in the publication of the [complete] works of Galen so that it may be understood that the works of Galen are a necessity and that without them it is hardly possible to care for the sick. [The Giuntas] resolved that they would seek so great an advantage for mankind and publish those works and determined that in this regard no effort or expense ought to be spared.

Wherefore since they knew that a large part of them had not yet been presented in Latin and that those which had been published in translation were found to be full of corruptions and mistakes—perhaps more the fault of the extant corrupt Greek copies which the translators appear to have followed than of those who rendered them into Latin—they decided that as often as possible they would seek out the most ancient manuscripts from the different libraries of Italy, to which those works which had been printed might be compared in order that their pristine splendor be restored. This was done with almost complete success since many very fine things worthy of note were found in them which were lacking in the printed editions, and also by referring to these manuscripts further errors were prevented from creeping into this work of theirs.

Then men learned in languages as well as in medicine were employed to translate into Latin all the works of Galen which had not yet been put into that language; and of those works which had been translated into Latin but, as I have said, through the corruptions of the copies had been badly done, they undertook to recast some, to correct some and to retranslate others. By their zeal and diligence as well as by the aid of those more

[26] Vol. I, ff. 2r-3v. Photostats of this letter were kindly supplied by the Historical Library, Yale University School of Medicine.

ancient copies of manuscripts those learned men have given us more nearly correct and clearer translations of the works which they undertook to translate than the Greek texts of the printed editions offer. Those who at their leisure are willing to compare these translations with the Greek can easily observe this. In the case of those works which were considered to require only correction, better translations of portions were made through careful revision, but it was not done in such a way that some books were accepted, some rejected, some partially revised, and others retranslated to the injury of anyone or the destruction of anyone's reputation, because it is readily apparent that errors of this sort had crept into these books through the corruptions of the manuscript copies rather than through the negligence or inability of the individual translator. But since good Greek copies of manuscripts were now available, and so corrected that the [old] Latin translations were no longer considered suitable unless they could be restored by new translations, [the Giuntas] believed that the venture should not be undertaken in such a way that mankind be defrauded of so great usefulness through superficiality. This should be understood by all good men, especially when they realize that the Giuntas undertook not only labor and responsibility for this common usefulness, but also very great expense, nor did they spare anything which they believed would offer some advantage to the work. There is almost no one who understood their great and excellent undertaking who would not aid it, for not only did many offer their translations and emendations to assist so distinguished a work, but those themselves to whom had been committed the translation and revision of the books were influenced, not for the sake of any reward but rather for the sake of aiding so worthy a project. For what reward, even from some great emperor, can be comparable to their efforts?

It was the intention of the Giuntas to have new translations made of many of those books which have been merely revised, but because it seemed to them and to those who daily demanded this new work that too long a time would elapse if new translations had to be awaited, they undertook that those books should be restored by diligent revision so that those who had translated them in the first place hardly recognized them any longer as their own. For you may understand that not only those works have been corrected which have the word "revised" at their beginning or display marginal corrections, but also those marginal annotations cannot properly be called more than the smallest part of all the corrections which have been inserted into the whole work, and as the term "revision" declares that those [particular] books have required the greatest correction, so it may not be denied that there were also other emendations elsewhere. However, the table of contents which is placed at the beginning of the volume will explain clearly and exactly what books have been emended and by what kind of correction, as was done in the work itself.

Moreover, so that nothing might be lacking that these works of Galen issue from the press of the Giuntas fully revised, it devolved upon me, who had been put in charge, to compare them with the copies of Greek manuscripts and to oversee the printing. I was diligent that it might all be printed as accurately as possible, but in this matter the burden was so great as to be almost beyond my strength, and I was compelled daily to read through so much that often there was not enough time for me to consider and weigh things one by one as the case required. Nevertheless, I do not hesitate to assert that I did everything with the greatest care and diligence and I never evaded labor or vigilance, so that because of assiduous concern and a too great solicitude I fell into a long and grave illness, and for many

days and months it was necessary to hand this task over to another. Hence you have as a result of my diligence all except the *Introductoria, Spuria,* and a large part of the fifth section of the work, whose corrections and emendations were overseen by that learned man who substituted in my place. If perhaps you find something in these works which may seem to have slipped by with too little consideration and which does not fully satisfy your very sharp judgment, I beseech you to ascribe it to the brevity of time rather than to any lack of diligence on my part, and—such is your kindness—that you pardon me who, with whatever knowledge and capability I possess—and I freely confess that it is slight—was responsible for all this. However, the Giuntas promise you that if hereafter any other translations of books of Galen come to light, those extant which have not been printed—which they will hope to accomplish—as well as those which have already been printed but in some part may be judged better than these of theirs, they will also publish them, not, however, printed in this large format but in smaller type so that everyone may obtain them more cheaply.

Gadaldinus completed his letter by calling attention to some, although not all, of the contributors to the enterprise. Among these was:

> Andreas Vesalius of Brussels, celebrated and notable professor of dissection of our age, who has presented us with the *De venarum arteriarumque & nervorum dissectione*[27] corrected in many places, and finally overcome by our entreaties and arguments as well as those of his friends, since we pointed out to him that too great a wrong would be committed if, through fear of offending his preceptor Andernach—for he feared this—he were to deprive mankind of so great usefulness, he emended the books *De anatomicis administrandis* with such effort that he almost remade them.

If it be recalled that Vesalius appears to have had no qualms about revising Guenther of Andernach's *Institutiones anatomicae* in 1538,[28] one may reasonably be astonished at his hesitation to revise his preceptor's version of the *De anatomicis administrandis.* Whatever the truth may be, if we take into account the number of minor alterations, a comparison of Vesalius' version with that of Guenther of Andernach certainly confirms the statement of Gadaldinus that "he almost remade" the work. However, Vesalius appears to have used the earlier version as his point of departure, and most of the alterations have little to do with the fundamental anatomical exposition but represent perhaps a clearer, perhaps a more literary, presentation. For example, a passage from Book

[27] The bibliography of these Vesalian versions is given by Harvey Cushing, *A biobibliography of Andreas Vesalius* (New York, 1943), p. 63 ff. Curiously Gadaldinus makes no mention of the third contribution of Vesalius to the edition, or rather combines them and in an order reversed from that in which they appeared. Correctly they are *De nervorum dissectione* and following this in the pagination of the volume, *De venarum arteriarumque dissectione.*

[28] *Institutionum anatomicarum secundum Galeni sententiam libri quatuor, per Ioannem Guinterium Andernacum. . . . Ab Andrea Vesalio . . . , auctiores & emendatiores redditi.* Venice, 1538.

One in the version of Guenther reads: *Pectus omnium quadrupedum latissimum habet humerorum claviculas humanis similes, faciem rotundam, collum exile,* and Vesalius' revised version is: *Et pectoris os omnium quadrupedum latissimum habet, claviculas humanis similes, faciem rotundam, collum breve.* It is, of course, impossible to pass any final judgment on the relative merits of the two versions without knowledge of the Greek texts employed.[29]

In a few instances Vesalius employs marginal annotations to call attention to his revisions, although why some of these passages have been singled out in this fashion it is difficult to comprehend. Of a passage in Book Two, which he has accepted verbatim from the earlier version, Vesalius remarks: "I Vesalius have retained the version of the [former] translator although it is not faithful to the Greek text which appears to have been mutilated, since here it ought to be said that those two tendons are occasionally attached to the same ligament; sometimes separated from each other, to different ligaments." In one instance in Book Eight he notes the possibility of the use of the term *sinibus ossium* in the place of *capitibus ossium* although (presumably on the basis of text) he retains the latter phrase which appeared dubious to him on anatomical grounds. In only these two instances do the marginal annotations suggest that Vesalius made any particular use of his anatomical knowledge in the course of his revision; otherwise his guide as far as revision was concerned appears to have been largely a kind of literary caprice. In Book Six he places one brief passage in brackets and notes that "this is not to be found in any of the manuscripts," but he does not explain why he retained the passage nor on what authority he altered the Latinity of the passage from that of the earlier version of Guenther of Andernach.

In most respects the revisions appear to be much like those of the medico-philologists, and one may wonder to what extent Vesalius (the strength of whose ability in Greek is open to doubt) employed Greek texts for his revision, and to what extent he relied upon John Caius. It has been noted that the two men were simultaneously involved, the one with the Latin and the other with the Greek text, and it is quite possible, in view of Caius' later criticism of Vesalius' version, that a rift between them developed when Vesalius, perhaps first assisted by and then departing from the philological interpretation of Caius, queried certain passages on

29 The Historical Library, Yale University School of Medicine, kindly supplied a copy of the earlier version of Guenther of Andernach for purpose of comparison.

the basis of his anatomical knowledge. Indeed, Caius, as will be noted below, calls attention to a specific instance of such difference of opinion.

To return to the more general question of the Giunta Galen, it may be said that despite Gadaldinus' somewhat exaggerated description of the amount of effort made by the Giuntas to procure manuscripts for the purpose of collation and despite a certain element of what may be termed "sales-talk," there is nevertheless a considerable amount of reliable information in the letter. Certainly some effort was made to improve texts and translations through the collation of manuscripts, and, as Caius mentioned above, on one occasion Gadaldinus sent to Vesalius some Greek notes which he had transcribed from a book in the possession of the Giunta family. In this instance, however, Caius informs us that:

> These notes, although they were of little value to Vesalius and to me, for they were in large part unfounded, nevertheless gave occasion for more carefully seeking out other copies. And upon inquiry I discovered another Greek text among [Cardinal] Bessarion's books in the library of San Marco in Venice, which was of some assistance in several places.[30]

Possibly Caius brought this information also to the attention of Vesalius since this was during the period before they severed friendly relations.

It may originally have been the intention of the Giuntas, as Gadaldinus writes, to issue Latin translations of such works of Galen as were newly discovered as well as revised and improved translations of the others, in a smaller and therefore cheaper format. Presumably, however, the response to the edition of 1541-42 was considerable—witness the Basel reprint of 1542—and the publishers apparently decided that from time to time there would be sufficient demand for a revised and augmented edition of the complete works in the original and, one may assume, more profitable folio format. Indeed, the successive editions became, if anything, more elaborate. A new edition was published in 1550 with a separate index volume composed by Antonio Musa Brasavola,[31] and further editions appeared in 1556, 1565, 1576, 1586, 1597-1600, 1609, and 1625, the eleventh and last edition as well as the ninth edition, if one counts from the elaborately refounded one of 1541-42. This latter enumeration appears to have been the one

[30] Caius, *De libris propriis*, p. 76.

[31] Aloysius Franciscus Castellanus, *De vita Antonii Musae Brasavoli* (Mantua, 1767), pp. 71-3.

favored by the Giuntas since they term the edition of 1541-42 "our edition" (*nostra editio*) and thereby indicated that the two earlier ones were merely borrowed reprints.

It is to the credit of the Giuntas that they did live up to the second promise of Gadaldinus to the effect that efforts would be made in the future to improve upon the Latin texts as well as to introduce whatever new works might be discovered. In regard to the matter of revision, and using as examples the two major Vesalian contributions, it must be noted that considerable change was introduced into the later editions, and some indication of this is given in the titles: "The book on the dissection of the veins and arteries, presented in Latin by Antonius Fortolus *Ioseriensis*, thereafter corrected by Andreas Vesalius of Brussels, and [now] in many places revised according to the Greek manuscripts by Augustinus Gadaldinus," and "The nine books on the conduct of anatomies, once presented in Latin by Joannes Andernach, and after the very careful revisions of Andreas Vesalius of Brussels, and also of others, revised in several places according to the Greek manuscripts." In the case of the first work the revision, most of it philological, is considerable in relation to the brevity of the work and is based to a large degree upon the collation of Greek manuscripts. However, it appears to represent additions more than corrections, and only once does Gadaldinus expressly call attention to what he considers a clear error in the Vesalian version.

The "Conduct of anatomies" is a much longer and far more important work. The title of the revised version, as given above, makes no mention of the identity of those who did the work of revision, and the marginal emendations are, in relation to the size of the work, far fewer than in the "Dissection of the veins and arteries." Vesalius is seldom criticized as inaccurate although the implication of inaccuracy is possibly there in such phrases as "Others consider that this should be read as. . . ." In one instance, II,8, a critic is mentioned by name: "Bartholomeus Eustachius, distinguished physician and noted professor of anatomy has warned that this place is false." In addition, a careful comparison of the original Vesalian version of the text with the later, revised version indicates that a great many unindicated, minor changes have been introduced for the sake of better expression and clarity, such as punctuation, shortened sentences, the substitution of nouns for pronouns, and a choice of more precise descriptive terminology. Such changes usually amount to little more than the

substitution of a single word, but on occasion an entire clause has been altered.

Although the editors of the successive Giunta editions of Galen were temperate in their consideration and treatment of the Vesalian versions, Caius, as we may expect, was forthright in his criticism. It was inevitable that as the complete Galenist he would be displeased with the Vesalian version of the *De anatomicis administrandis,* and the more so since he was contemporaneously working upon the preparation of an annotated Greek text of it which was published in Basel in 1544.[32]

> It is therefore greatly to be regretted that the remaining books of Galen's [*De anatomicis administrandis*] have not been seen, so I understand, for many years. Ambrosius Calepinus in his remarks on medicine, that is, in the edition of Hagenau 1526, relates that a large part of the anatomical section was once in the possession of a certain Antonio Visconti, I believe in Italy. I augmented my commentaries on that same work in which, among other things, I spoke of ginglymus, because recent anatomists have expressed it by an alien figure, and of the septum [lucidum] of the brain as separating, not supporting, because that place in book nine of Galen's anatomy is read in a corrupted emendation by Vesalius.[33]

If we turn to Caius' edition of the Greek text of the *De anatomicis administrandis,* we find that his remarks are almost wholly philological. Never does he appeal to the inspection of the human cadaver, and as a result these remarks are chiefly interesting for the information which they provide about his relations with Vesalius. Caius' first concern is with the question of the authenticity of a Galenical phrase which he feels that Vesalius had wrongly deleted:

> Andreas Vesalius, when at one time we lived together in the same dwelling, and used to compare our anatomical studies, warned by certain manuscripts which had some interpolations from an old codex, considered that these things ought to be deleted. But I do not know whether it was written on the basis of the codex or on the interpretation of the transcriber.[34]

The second reference, while similarly philological, is especially interesting since it is the sole instance in Caius' writings of any commendation of Vesalius:

32 *Cl. Galeni . . . libri aliquot graeci partim hactenus non visi, partim a mendis quibus scatebant innumeris ad vetustissimos codices repurgati & integritati restituti, annotationibusque illustrati per Ioannem Caium . . .* (Basel, Froben, 1544).

33 Caius, *De libris propriis,* p. 77.

34 Caius, *Libri aliquot,* p. 286.

I would have undertaken to describe this remarkable matter with the pencil as a thing worthy to be understood by a well-informed man except that regarding it there already exist the books of Andreas Vesalius of Brussels and Joannes Baptista Cananus of Ferrara, experienced anatomists, in whose books this and other things have been so graphically and excellently depicted that nothing more can be desired.[35]

The final reference harks back to the dispute over manuscript versions, this time the question of the proper sequence of four Greek words:

In the manuscripts which I said Vesalius had shown me, this [phrase] was written in a converse order. . . . But I was suspicious of their reliability since the texts retained more of the interpretation of the scribe than the trustworthiness of age.[36]

A further reference to his edition of 1544 is to be found in Caius' autobiographical *De libris propriis;* and here the criticism is extended to the *Fabrica:*

Also I have warned the reader in those commentaries or annotations of certain places in the anatomical books of Galen which Vesalius corrupted when Antonio Giunta the Venetian printer committed to him the task of revising them. Among these one is in book nine of the anatomy, page 335, on the septum [lucidum] of the brain. I added a true picture of the ginglymus in the sense of Galen at page 299, which Vesalius had expressed very incongruously and clearly incorrectly earlier in the first edition of his book in the year 1543, at page 14, because in that there was no mutual ingress of the metal as there is in the ginglymus of the bones of the human body.[37]

In the summer of 1543 Caius left Padua. ". . . in July of that year I departed from Padua for Florence and Pisa for the sake of hearing that very famous man Matthaeus Curtius, my preceptor in medicine."[38] Caius' admiration for Curtius is once again indicative

[35] *Ibidem,* p. 287.

[36] *Ibidem,* p. 320.

[37] Caius, *De libris propriis,* p. 82.

[38] *Ibidem,* p. 86. Matthaeus Curtius, or Matteo Corte, 1495-1564, the brother of the celebrated jurist Franciscus, was born of a reputedly noble but impoverished family of Ticino. Having become M.D. there, he taught first in his native school and thereafter gained a considerable reputation as professor of the theory of medicine at Padua, 1524-1532. He was called thence to become personal physician to Pope Clement VII, upon whose death he taught at Bologna and thereafter, upon the invitation of Duke Cosimo de' Medici, at Pisa where he remained until his death. In the epitaph upon his grave, provided at the expense of Cosimo, he is termed "Vindicator of Hippocrates and Galen" (Ghilini, *Teatro d'huomini letterati,* II [Venice, 1647], p. 195). Obviously he was a man who would be attractive to Caius in their common appreciation of Galen. At one time Curtius and Vesalius had been friendly, and in his *Epistola docens venam . . . secandam* (1539), Vesalius calls him "a man of penetrating judgment" and recounts the friendly visit which he had had with Curtius in Bologna. Later, however, there was a falling out, and Cardan in his mention of this dispute indicates a sympathy for Vesalius' position, remarking upon the restraint which he had displayed (*Opera omnia,* I [Lyons, 1663], p. 12). Cardan knew Curtius well, having been an auditor of his lectures in Padua, succeeding him at Pisa, and lending him money (*Ibidem,* pp. 26, 12). In addition to a certain irascible quality in his nature, Curtius was probably unsympathetic to Vesalius for much the same reasons as Caius.

of his conservative nature since Curtius was a Galenist; he was also once a friend of Vesalius but as the latter developed into a true scientist and inevitably became critical of Galenical anatomy, animosity replaced the former friendship. Caius' admiration of the pro-Galenical, and therefore the anti-Vesalian, school is also apparent in his high opinion of Jacobus Sylvius whom, however, he knew only through the latter's writings, and his similar admiration for Vesalius' former teacher, Jeremiah Drivère, likewise a Galenist and therefore an opponent of Vesalius.[39]

At this time Caius was seeking to restore the text of Celsus, and thus upon leaving Padua:

> was carrying with me a copy of Celsus; and having obtained transcripts of three manuscript copies at Florence at San Lorenzo in the public library of the most illustrious prince Cosimo de' Medici, which displays to all students of letters the culture and kindness of the prince, I labored diligently that by my studies I might render Celsus more nearly correct. I was indeed grieved by the injury which he had endured through the fault of men and of time; it was painful to me that the eloquence of so great a man, who ought deservedly to be considered the first of Roman physicians, was corrupted and his medicine lay neglected. And since I desired to give aid in this matter, I compared with the three Florentine codices, of which one was very old and the others more recent, the Celsus published at Lyons in the year 1542, because it seemed to me very well emended. Likewise I compared them with those editions published in Venice and Solingen. Yet whenever I was in doubt in them I took into account another [manuscript] of Urbino in the library of the Duke of Urbino . . . which I finally obtained only after three days' petition, such is the difficulty of entrance into the library of that man, whether because of his nature and temperament, or whether because a little earlier he had incurred a lack of gratitude from a printer to whom he had lent the whole of Galen's *De remediis parabilibus.* . . . I also employed another [manuscript] of Lazarus Bonamicus[40] when I returned to Padua. . . . These not sufficing, I also consulted Hippocrates himself, because Celsus so imitated him . . . but so discreetly that you may not easily discern it unless you are well versed in Hippocrates. Freed in this

[39] In view of the bitter hostility of Sylvius against Vesalius because of the latter's criticisms of Galen, the reason for Caius' appreciation of Sylvius is obvious although he nowhere displays a similar lack of restraint in his attack. The appreciation of Drivère is based on similar although less obvious grounds. On Drivère cf. the recent study by Henri de Vocht, *History of the foundation and the rise of the Collegium Trilingue Lovaniense, Part the second* (Louvain, 1953), pp. 531-42.

[40] Lazarus Bonamicus, *ca.* 1479-1552, was a scholar whose classical taste naturally appealed to Caius. Despite his humble origin in Bassano, Bonamicus received the financial patronage which his intellectual gifts deserved and was able to study at Padua where he learned Latin from Calpurnius, Greek from Musurus, and philosophy from Petrus Pomponatius. Thereafter he taught at Bologna and Rome. In 1530 he was appointed professor of Latin at Padua where, despite efforts to attract him elsewhere, he remained until his death. He was an exacting scholar who developed an elegant Ciceronian style and regarded the achievements of the classical world as supreme. During his lifetime he published little or nothing although after his death some of his letters, discourses, and poems were published by various friends. Caius' knowledge and respect for Bonamicus was consequently based upon a personal relationship. Cf. G. Marangoni, "Lazaro Bonamico et lo studio padovano," *Nuovo archivio veneto,* 1901, 118-51, 1902, 131-96.

manner from various doubts . . . I emended many things. Yet in the discords of the codices and the silence of the editions, because of the corruptions, . . . I was compelled to interpose my judgment and opinion, but in such fashion, however, that I might warn the reader of it in a brief note. . . . The books were very often discordant, and especially the more recently written ones, because very often they had been scattered and when brought together they were corrupted through the fault of the copyists. That ancient [manuscript], of more or less nine hundred years, had the greatest integrity. Of the more recent, one was the property of Piero de' Medici, written in the year 1427 by Antonio Mario the elder. The other had belonged to that highly cultured man Angelo Poliziano, as I realized from its subscription in his autograph, and was written by Antonio Mario the son in the year 1453.[41]

Such was Caius' method by which he sought to prepare a text as nearly faultless as possible, and one which was highly praiseworthy from the philological point of view although of somewhat dubious merit insofar as his ultimate purpose was concerned—the advancement of medicine solely from classical precepts.

In his search for manuscripts Caius visited many of the important libraries of Italy and, always appreciative of any help he received, he was especially pleased with what he considered the great aids to scholarship offered by the Medici, both the earlier tyrants of Florence and the later ducal line.

Also I collected notes for myself as a kind of commentary for a future emendation of all the Greek works of Galen . . . from the ancient books of Italy which I travelled through about the year 1543 in order to observe the customs of the people and the libraries. And especially from those good but very poorly housed and cared for books in the library of SS. John and Paul in Venice. For many are badly torn, and especially the books *De usu partium* so that not even vestiges remain of the true reading. Also from the books of the library of SS. Mark and Anthony in the same place; and from those of S. John *de viridario* of Padua which—if my memory does not deceive me—that Bessarion of Greece and Patriarch of Constantinople gave. Likewise from the books of the public library of the Medici family in San Lorenzo in Florence. . . . I speak of these libraries in particular because at Ferrara in the library of S. Dominicus, which Caelius Calcagninus furnished with many books, and that of S. Angelus which Hercules I, Duke of Ferrara constructed, and of San Marco and of Santa Maria in Florence, and of S. Dominicus and of S. Salvator in Bologna there were in my time few good books, and in the library of Siena which Pope Pius III built in the cathedral, none at all. . . . In the academy of Pisa, long neglected up till then but revived in the year 1543 by the kindness of that best of dukes Cosimo de' Medici, and adorned with new schools, there was, as far as I know, no library. Nevertheless there will be when opportunity is permitted to that very learned prince if, meanwhile, one has not already been established. Aside from libraries, I saw certain books in Pisa in the possession of [Matthaeus] Curtius and of Pontremulus; and in Ferrara in the possession

41 Caius, *De libris propriis*, pp. 86-7.

of Antonius Musa Brasavola, Nicolaus Bonasciolus, Hippolitus Cananus, and Joannes Baptista Cananus. For I visited those learned men for the sake of medicine.[42]

Thereafter Caius returned to Padua and thence journeyed to Germany where he saw Melanchthon, Joachim Camerarius, and Sebastian Münster, "with all of whom I was acquainted," and to Louvain where he became acquainted with Jeremiah Drivère.[43]

Caius appears to have returned to England either late in 1544 or in 1545.[44] Thereafter there is very little reliable information about his activities until he was admitted as a fellow of the College of Physicians in London, 22 December 1547.[45] As a fellow and as an antiquary it was inevitable that he would be interested in the history of this body which in considerable measure was due to the good offices of Thomas Linacre whom Caius considered rightfully as a distinguished scholar and as a kind of spiritual forebear. Like Linacre, in time Caius was not only to be a distinguished member of the College but for a long period its president and most influential member.

However, prior to his entrance into the College of Physicians and shortly after his return to England, about 1546, Caius began to give lectures and anatomical demonstrations to the Barber-surgeons of London. By the charter which the Barber-surgeons had obtained in 1540 they had the right annually to four bodies of executed criminals for dissection, and this was the source of Caius' demonstration material. Bullein refers to these lectures in his *Little dialogue* of 1579: "Whereas through learned lectours and the secret anothomies by and through the learned doctor M. John Kaius, reveiling unto this fraternity the hidden jewels and precious treasures of Cl. Galenus, showing himself to be the second Linacer."[46] The suggestion, of course, is that Caius' lectures, of whatever merit they may have been, were Galenical in nature rather than progressively scientific like those of his erstwhile friend and fellow-lodger in Padua, Andreas Vesalius. Somewhere in the neighborhood of 1565 Caius prepared an edition (never published) of the Greek texts of some of Galen's works, including *De septimestru partu* and *De ossibus*

42 *Ibidem*, p. 102.

43 *Ibidem*, pp. 102-3.

44 Venn, *op. cit.*, p. 7.

45 *Annalium Collegii Medicorum Londini, anno 1555 institutus Joanne Caio praesidente & authore*, in the *Works*, p. 16.

46 Venn, *op. cit.*, p. 9.

which I emended for Thomas Maro, because this student of anatomy and constant admirer of nature was present for almost twenty years at my anatomical dissections, like Boethus at those of Galen in Rome. By the wish of the most illustrious prince Henry VIII, King of England, I performed them in London before the surgeons; among the physicians at that time there was no dissection. Maro, as it happened, was much concerned with studies of seven months' birth, the uncorrected book of Galen with that argument being available.[47]

Thereafter Caius indicates his total enslavement, even to the physical appearance of Galen's books:

I abolished all divisions into chapters in the book *De ossibus* because I never saw the speech of Galen distributed into chapters in the old texts and because I desired that Galen might always appear as he was originally. . . . Yet I desired that the titles remain because I often saw them in the old copies. From this I conjectured that they had been placed there by Galen.[48]

Despite the ever-increasing influence of Galen upon him, Caius has been described as "mainly responsible for introducing the study of anatomy into England," and in 1557 at Cambridge where the study of anatomy was to be regularized in 1565 by the annual grant of two bodies of criminals or unknown strangers to Caius College for dissection.[49] It was at Cambridge that William Harvey attended Caius' anatomical lectures, as we learn from Harvey's notes, and, indeed, Caius by joining with Lord Lumley in founding the Lumleian lectures in 1582 helped to make possible Harvey's researches. It was in the anatomical theatre built to complement the Lumleian lectures that Harvey made his famous demonstration.[50]

The College of Physicians had already assumed a position of great importance through the combined wisdom of its founding members and of Henry VIII who had granted it powers, later extended, to police and to regularize the practice of medicine. Since these prescriptions as written and understood by Caius seem never to have been translated (or at least published), it may not be amiss to present them in an English version.

Henry the Eighth, the most serene King of Britain, in order that he might preserve his people from the dangers and errors of unskilled persons, on 23 September 1518, and the tenth year of his reign, by his charter or letters patent, sealed with the great seal of England, granted in perpetuity the establishment of a College of Physicians of London, and, in the name of the College, he gave to John Chamber, Thomas Linacre, Ferdinand de

47 Caius, *De libris propriis*, p. 90.
48 *Ibidem*.
49 Sir Walter Langdon-Brown, "John Caius and the revival of learning," *Proc. Roy. Soc. Med.*, 1941, 25, 66.
50 *Ibidem*, p. 64.

Victoria, his physicians, and to Richard Halswel, John Franciscus, and Robert Yaxley, leading physicians of the city of London, power to choose a president from the fellows, whom afterwards Parliament called the elects, to have a common seal, to possess properties or funds to the annual value of twelve pounds, to plead lawsuits before any judges in the name of the president and the College to prevent anyone, unless licensed by the College, from practising medicine in the city of London, its suburbs or within an area of seven miles around [the city], or be fined five pounds for each month; to make statutes, to call meetings, to establish four judges or censors of the writings, morals, and medicaments of anyone practising medicine both in the city and outside, to punish offenses by imprisonment or fine, and to be exempt from the burdensome affairs, commands, and services of the city.

He caused that all these things be ratified through the suffrage and authority of his Parliament, as they were, in the years 1522 and 1523, and the 14 and 15 of his reign, and also that it be determined through the Parliament that the power of choosing the president, and only from their ranks, be in the possession of six principal physicians, to whose ranks two others be added from the fellows, grave, worthy and learned men, so that these eight as a result be named elects. Upon the death of one or more, accordingly within thirty or at most forty days it be determined by the remaining elects that another or others of the fellows be substituted, but not merely any learned and experienced persons, but those whose doctrine, morals, gravity, and experience have been known, observed, and approved by the first elects and censors or judges of letters and morals.

The same king, through the same Parliament, added to these things that through the whole of England no one might practise medicine unless first permission had been received from this College of London, witnessed by a letter sealed with the common seal, but so that first he submit to the judgment of the president and at least three of the elects or judges and censors of morals and letters, unless he had received the degree in medicine in the Universities of Oxford or Cambridge, and that all things first had been accomplished which customarily and according to the statutes of each university pertain to that degree, without any exception, that is, dispensation or license in place of those things.

The same very illustrious king in his Parliament of the year 1540, and the 32 of his reign, confirmed what he had first granted by his charter and Parliament, as was said, and now for a second time he wished them to be confirmed, that is, that the College be protected also by the authority of this Parliament lest any physician of the College be molested by some urban or suburban duty, and lest he be required to perform military service in the city of London or the suburbs; and so that the power be in the possession of the president and those of the College who are the elects, of choosing the four censors or judges of the apothecaries or physicians, from very learned, prudent, and discreet men, who on oath and upon the apothecaries having taken to themselves overseers whom they call guardians, as often as it will please them or be just, will bear judgment regarding the medicaments of the apothecaries, burn what is vitiated and order a fine of five pounds for those refusing entrance into their shops as often as it occurs, but it must be paid, according to the judgment, equally to the king's Majesty and the accuser. And if of the censors or judges anyone is chosen who refuses to undertake the burden and duty when there is no justification for refusing, also by this same Parliament and by royal agreement it was stipu-

lated that he be fined forty shillings. Also by the same Parliament it was granted that physicians of this College may if they wish, practise not only the pharmaceutical and dietetic parts of medicine but also the surgical.

The opinion of the most serene Queen Mary, as well as the authority of the Parliament of the year 1554 and the first of her reign, strengthened all these things, by which, furthermore, it was agreed that if the guardians of the apothecaries, or one of them, is unwilling to be present with the censors or judges of the apothecaries, even without them it is permitted that the latter perform their duty; and that, except the Tower of London, all jails, both in the city of London and the suburbs, for a circuit of seven miles and as far as the authority of the College extends, are at the service of the College. Finally, that all justices and other officers and ministers of the queen's Majesty and the commonwealth are always at the service of the president and the College, and those to whom the authority has been delegated, for carrying out the statutes, whenever their service and function are required, under penalty of contempt of the queen's Majesty and of her successors.[51]

Two instances of disciplinary action taken by the College of Physicians are of special interest in respect to the relation of Caius to Vesalius. In the *Annals* of the College for 1555, in which year Caius was president, we find the statement:

Examined and penalized were Marcus Clen, surgeon, Leonardo Savery from Flanders, David Lawton, coppersmith, Joannes Atkynson, antecedents unknown, Joannes Goodriche, broker, Oliver Wilson, surgeon, Laurentius Valentine, gypsy, Gasparin, an Italian, Thomas Geminus of Flanders,[52]

for seeking to practise medicine without the necessary license. However, those unskilled quacks were not the only offenders. Despite the efforts of the College of Physicians to prevent any but properly licensed persons from practising medicine, both universities from time to time issued medical degrees to persons considered unqualified by the College but who were able to avoid prohibition or penalty by means of their university degrees. The result was a considerable correspondence between the College of Physicians and the Universities of Oxford and Cambridge, each institution naturally jealously guarding its prerogatives.[53] Finally, when somewhat grudgingly a solution was reached whereby the College might extend its authority outside London, we find in the Annals the following statement:

Thus as it was announced, many having been penalized, several having been put to flight, and certain ones in the city of London and the suburbs having been warned, it seemed to us that it would also be more suitable for the health of the commonwealth if we were to extend our authority into other parts of the kingdom. Wherefore a letter having been composed in accordance with the statutes to the highest court of Parliament and ap-

[51] *Annalium Collegii Medicorum institutus*, pp. 5-7.
[52] *Ibidem*, p. 22.
[53] *Ibidem*, pp. 23-35.

proved first by the very learned men Masters Rastall and Walpole, justices, then by the distinguished jurist, Master Broke, chief justice of the court of common pleas and representative of the king's Majesty, and finally by the very Reverend Edmund Bonnar, Bishop of London, without whose authority no one is permitted to publish anything, we undertook to have the letter printed by Thomas Geminus in place of his fine, which otherwise he would have had to pay in a sum of money, and this statement was printed in English in 200 copies.[54]

We gave this letter to the constituted investigators and granted them, in our name, authority to prevent anyone in their regions from practising medicine unless either one or the other university—I mean Cambridge or Oxford—had approved him without exception or dispensation, or we had approved him by their letters sealed with our common seal or we, by our letter. They obliged any other person practising, by honor, written promise, or bail, that he appear before us in our College in London, at a suitable time set by them, and lest he practise medicine before he appear before it, he was prohibited by legal obligation. If he should scorn them and not obey, they might seek assistance from justices, magistrates, and other officials of the king's Majesty by the royal authority granted to us and cast the man into prison until he should obey and act in accordance with the law.[55]

As a sixteenth century English publication this letter, which according to Caius appeared in an edition of 200 copies, seems to have gone unnoticed. At least there is no record of it in the *Short Title Catalogue,* nor is it recorded under Geminus, the printer, in Morrison's *Index*. Since it appears not to be recorded in the catalogue of the library of the British Museum or in that of the Royal College of Physicians, it may well be that no copies of it have survived.

> To all Justices, Maiors, Sherifes, Baylifes, Constables, and other ministers and officers, and to all others to whom it apperteyneth, the praesident and College of Physicians in London Sendeth gretyng.

Where it hath pleased our late soueraigne Lord & Kyng of famose memory Henry the eight, with the consent of his parlament holden at Westminster in the 14. and 15. yeres of his gratiose reigne, And our soueraigne Lady Quene Mary, with the consent of her parlament holden at Westminster in the first yere of her reigne, to geve authorite vnto vs the praesident and college of physicions in London, for the helth and safetie of theyr subiectes, to suruey, ouersee, examyn, iudge, correct, and gouerne al physicions, foren and others, together with theyr medicines, which practise within the citie of London, the suburbes of the same, seven miles cumpasse, and the rest of England, with authorite also to committe al offenders against the said actes for their offenses or disobedienses, to al your prisons: And commandement to yow al, vpon request to yow made by vs, to helpe, aide and assiste vs, and al persons by vs from tyme to tyme authorised, for the due execution of the said actes and statutes, vpon payne for not geuying

54 *Ibidem,* p. 36.
55 *Ibidem,* pp. 37-8.

such aide and assistence, to runne in contempte of the quenes majeste, her heires and successors: We desire yow all and by vertue of the Lawes above mensioned do require yow, and euery one of yow, as yow tendre the good meanyng and due execution of the said actes and Lawes and also your owne healthes, lyves and sauetie of your cuntres, that yow aide and assiste our wel-belouyd. N. by vs authorised, in al such thinges as he shal require your aide and helpe, for the due execution of the said actes and Lawes, for that we vnderstond by complayntes made vnto vs that many lewde, vndiscrete, and vnlearned persons, as wel strangers as of owr own nation, be resident in your cities townes and countreis and others many wandryng about in the same with chaungeable names and false medicines to your gret abuse, decyte of the Kynges people, and losse of goods and lyves of the same. Geven at our College in London vnder our commune seale the xx. day of Septembre in the yeare of our Lord God 1556. And in the third and forth yeare of the reigne of philip and mary, by the grace of god kynge and quene of England, Spayne, Fraunce, bothe Siciles, Jerusalem and Irelande, defendors of the faith, Archedukes of Austrie, Dukes of Millane, Burgundy and Brabant, Counties of Haspurge, Flaunders and Tyrolle.[56]

These incidents in the early history of the College of Physicians are concerned not with any actual relationship between Caius and Vesalius but rather with a supposed relationship. In the concluding remarks to his *Epistola de radice china* (1546) Vesalius turned to the irksome problem of plagiarism with which he had been bothered from the time of the appearance of his *Tabulae anatomicae* in 1538. In particular he was now disturbed by a work which had been published in England in the previous year, 1545, which, as he notes, although it must have been costly to produce yet it presented its borrowed illustrations "obscurely and unskilfully." This must surely have been the *Anatomia delineatio . . . aere exarata per Thomam Geminum.*[57] It is true that the work represents a flagrant but certainly a far from unartistic plagiarism from the *Fabrica* and the *Epitome,* and what Vesalius appears actually to have been concerned about were the obliterations from the figures of certain of the more minute anatomical details and the nullity of the illustrations as pedagogical devices.[58] However, Vesalius does not attempt to identify any of the responsible parties. On the other hand, in the dedicatory letter written by his brother Franciscus, there is a fairly clear, if perhaps irresponsible, effort at identification since Franciscus writes that the guilty party was "a certain Englishman whom I believe my brother lived with at one time."[59] Since the only Englishman known to have lived with

[56] *Ibidem,* pp. 36-7.
[57] For a full bibliographical description, cf. Cushing, *op. cit.,* pp. 122-26.
[58] *Opera omnia,* II (Leyden, 1725), p. 681.
[59] *Ibidem,* p. 619.

Vesalius was John Caius, it has been assumed by many that he was guilty of instigating the work, and presumably, if this charge is accepted, he either brought back to England or sent copies of the *Fabrica* and the *Epitome* as the sources of the plagiarism.

While in this instance Vesalius did not look upon imitation as the sincerest form of flattery, yet whether he realized it or not, the woodcut engravings of the *Fabrica* and the *Epitome* were the sources of the "first engravings of any artistic importance produced in England,"[60] be they the work of Pieter Coeck, as some consider, or of Thomas Geminus, who was also the publisher of the work and, as has been indicated, was later convicted of the illegal practice of medicine by the College of Physicians.

However, it is difficult to believe that Caius was involved in this venture. First of all, he left England in 1539 and did not return until late in 1544 or even in 1545, and it does not seem likely that he would have been in touch with such a man as Geminus. Furthermore, Caius the conservative was a stickler for form and regulation, and it would have been decidedly contrary to his character for him to become a kind of silent partner in any undertaking with Geminus who, although termed a surgeon, was looked upon by the College of Physicians as a foreign adventurer, quack, and law-breaker. Caius himself had had a taste—as the victim—of plagiarism, although of a somewhat milder nature. Mention has already been made of the relatively harmless oral form of plagiarism perpetrated by his friend Knolles in Padua. Another instance, although of later date, concerned the printer Gulielmus Rouillius of Lyons who "had corrected his Latin text [of the *De anatomicis administrandis*] from my Greek one, and having transferred my annotations almost verbatim into his, published a small volume at Lyons in the year 1551."[61] Also it should be noted that the charge against Caius rests not on the evidence of Andreas Vesalius but rather on a declaration by his brother Franciscus which, incidentally, the latter qualifies by the phrase "I believe." Finally, to decrease still further the likelihood of Caius' implication in the plagiarism, it has been observed above in some detail that he was genuinely and consistently a Galenist, and as such he was unlikely to be greatly interested in those illustrations which the Galenist tradition of that age frowned upon.

60 Arthur M. Hind, *Engraving in England in the sixteenth and seventeenth centuries* (Cambridge, 1952), p. 44.

61 Caius, *De libris propriis*, p. 83.

Poisoning With *Dieffenbachia*

BYRON A. BARNES* AND LAURETTA E. FOX†

DIEFFENBACHIA, a genus of New World plants, has achieved a considerable degree of popularity as a house plant, especially in southern United States. *D. seguine* Schott (*Arum arborescens*) was cultivated in England as an ornamental before 1759, according to Martyn.[26] The handsome colorful leaves of several varieties are prominent today in displays in both florist shops and variety store plant departments. The common use of these plants with their conspicuous leaves and luxuriant foliage in pots or indoor beds often near the floors of modern homes has increased the dangers of poisoning from them.[14] Their large showy leaves are attractive to children who may chew them without finding immediate contact distasteful.[8]

In its native habitat *Dieffenbachia* grows in the shady, moist lowlands of many parts of tropical America, extending as far south as the Amazon drainage basin in Brazil and having its northernmost reaches in the islands of the West Indies.[24,27] The large picturesque plants of this genus bear the name of J. F. Dieffenbach (1794-1847), noted German physician and botanist. These plants were first placed in the genus *Arum*, but were later transferred to the genus *Caladium*, described in 1800 by Vénénat. In 1829 Schott described the genus *Dieffenbachia* in compliment to Dr. Dieffenbach, and both *Caladium pictum* Lodd. and *Caladium seguinum* (Vent.) Willd. were placed in this genus by Schott at later dates.[16,27]

Bailey,[3] in his *Manual of Cultivated Plants*, gives the following description of *Dieffenbachia* Schott:

> Caudex thick, erect or at base creeping, leafy toward the top: lvs. with long clasping or sheathing petiole and oblong to ovate entire blades, mostly broad and conspicuous midrib and curving-ascending side-veins: peduncles from the sheaths, shorter than petioles: spathe oblong, persistent, the lower part convolute and including the pistillate fls., throat open, blade narrow, trough-shaped or partially open, straight or recurved; spadix erect, nearly as long as spathe; ovary 2-3 celled, with similarly lobed stigma.

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Some 25 to 30 species are recognized today, but most authorities are still in disagreement as to the correct cataloging of the ever-increasing numbers of varieties which number well into the hundreds.[2,6,11,16,22,27] It appears to be the concensus of opinion that nearly all kinds are variants of or hybrids of, and hence referable to, two polymorphic species.[2,10] Of these two species *Dieffenbachia picta* Schott (Plate I) apparently varies more widely, producing the greater number of white-spotted varieties with the remaining group falling under the type species, *Diffenbachia seguine* Schott.[3] The former species may usually be differentiated by its broadly grooved or channeled petioles, while the petioles of the latter are little, if at all, channeled.[6,39]

One of the best known and most frequently described members of this genus is *D. seguine* Schott (*Arum seguinum* L; *Caladium seguinum* [Vent.] Willd.) which is commonly called dumb cane (Plate II). In 1707 Sir Hans Sloane,[32] Fellow of the Royal College of Physicians and Secretary of the Royal Society, who had been physician to the Duke of Albemarle in Jamaica some eighteen years previously, explained the origin of this name:

> If one cut this Cane with a Knife, and put the tip of the Tongue to it, it makes a very painful Sensation, and Occasions such a very great irritation on the salivary Ducts, that they presently swell, so that the person cannot speak, and do nothing for some time but void Spittle in a great degree, or Salivate, which in some time goes off, in this doing in a greater degree, what European *Arum* does in a lesser, and from this its quality, and being jointed, this *Arum* is called Dumb-Cane. . . .
>
> Strangers must be warned of these Canes, they looking like those of Sugar.

Other common names employed are "Comida de Culebra" or "Sahinillo" (Costa Rica), "Hoja de Puerco" (Honduras), "Bejuco de Puente" (Nicaragua), "Rabano" or "Rabano Cimarron" (Puerto Rico), "Cuyanigua" (Salvador), "Oto de Lagarto" (Panama), "Pédiveux vénéneux" (France), "Giftiger Aron," "Schlierling's Caladium" or "Schweigrohr" (Germany), "Poisonous Arum," "Poisonous American Arum," or "American Arum" (United States).[1,7,24,27]

The acrid nature of plants belonging to the Araceae, in general, is quite well known.[28] Bigelow[5] in his *American Medical Botany* in 1818 wrote:

> The acrid property, which resides in this species of *Arum (A.triphyllum)*, appears to depend upon a distinct vegetable principle in Chemistry, at present little understood. It is extremely volatile and disappears almost entirely by heating, drying or simple exposure to air.

Dieffenbachia is no exception to this quality and according to Hooker[17] it yields no other in this respect. Sloane[31] was among the first to warn us of this acridity, labeling one species "labris desgustantes mutos reddens." Yet he also mentions[32] that dumb cane is eaten by the Indians for want of better meat. However, Fox and Barnes[13] found boiling water extracts of *D. seguine* highly toxic.

"The Root is of more force than the Fruit or Leaves." This observation of Sloane[32] is supported by the work of Fox and Barnes[13] who found the expressed juice of the stems of several varieties more irritating to rabbit's eyes than the juice from leaves. The expressed juice from old stems was more irritating than that from young stems.

The nature of the toxic constituents is unknown. Madaus[24] in 1938 listed a poisonous alkaloid, glycoside or bitter substance, but also referred to the work of Pool who reported calcium oxalate in his publications of 1878 and 1897. In a later publication Madaus and Koch[25] leave open the question of the nature of the toxic constituents but postulate that the substances may be of hormonal nature. The testimonies brought out in the Nuernberg trials do not support the latter assumption. Fox and Barnes found no more soluble or total oxalate than is present in several edible vegetables.[40]

While many of the early legends and reports concerning the toxicity of various plants are grossly exaggerated, the majority of those dealing with *Dieffenbachia* seem to be well founded. Although present-day literature deals largely with the power of *D. seguine* in producing loss of speech, earlier reports describe many varied and unique ways in which dumb cane was employed.

The Tucuna Indians of the upper Amazon, according to Tschirch[37] in his *Handbuch der Pharmacognosie*, used the stems of *D. seguinum* in the formulation of curare as an arrow poison. This type of curare described by Planchon[29] as protocurare contains *Strychnos Castalnaei* Wedd. and may be identical with the Jor curare of Boehm.[30] Planchon claims that this type has always been very rare in European markets.

LE CURARE DU HAUT AMAZONE (Protocurare) est en pots d'argile (carriços) de formes et grandeurs variables, contenant 20 à 30 grammes de poison; il est à base de *Strychnos castelnaei* Wedd., avec *Cocculus toxicoferus* Wedd., trios *Piper*, deux Aristoloches, une Aracée, le *Dieffenbachia seguine (Caladium seguine* Vent.) et une Phytolaccacée, le *Petiveria alliacea* L., mais la formule est variables et, dans la bassin du Yapura, on emploi-

erait avec le *S. Castelnaei* et le *Cocculus toxicoferus* un autre *Strychnos,* le *S. Yupurensis* G. Planch., le *Strychnos guianensis* une Spigélie, une Aracée, etc.

The irritating property of the juice when applied to mucous membranes was described by the Reverend Mr. Griffith Hughes,[19] Rector of St. Lucy's Parish of Barbadoes and Fellow of the Royal Society:

> The body of the Plant hath some Resemblance of a Sugar-cane. From thence, and from the Effects it hath upon Persons who ignorantly taste it, it derives the Name of *Dumb-Cane;* for as soon as any of the Juice is swallowed, the Tongue, Fauces, and Oesophagus, immediately swell so prodigiously, that the Person afflicted cannot speak. It so affects the salvial Glands, that it causes an immediate Salivation.

Earlier Ligon[21] had referred to it as poisoned cane. Martyn,[20] in his edition of *The Gardner's and Botanist's Dictionary* by Philip Miller, published in 1807, describes the use of dumb cane as a means of punishing slaves: ". . . in Jamaica, where it is said they sometimes rub the mouths of their negroes with it, by way of punishment." Philip Miller was a Fellow of the Royal Society, a member of the Botanic Academy at Florence, and Gardener to the Worshipful Company of Apothecaries at their Botanical Garden in Chelsea. The original edition of his dictionary was published in 1760.

Hooker[17] in 1823 related a similar experience:

> . . . When Mr. MacNab, the excellent Superintendent of the Edinburgh Botanic Garden, was at Kew, a box of these plants arrived there from Cayenne. One of the men employed to remove the individuals to the stove, incautiously bit a piece of one of them, when his tongue swelled to such a degree that he could not move it; he became utterly incapable of speaking and was confined to the house for some days, in the most excruciating torments.

And Heal[15] in a recent gardener's chronicle warns similarly:

> In taking cuttings or potting the plants be careful not to allow the knife or tying material to go near the mouth, as a poisonous, acid juice produced by the plant gives intense pain and causes the tongue to swell so as to render speech impossible; I knew a gardner who was ill for a long time by accidentally putting the tying material in his mouth.

Kremmens[20] relates a story of its being rubbed into the mouth of an eye witness to a crime by the culprit. When the witness was called into court in the Bahamas, he could not testify and the criminal was acquitted.

Plate I

Plate II

The only work reporting and comparing the toxicities of several varieties is by Fox and Barnes[13] who instilled the expressed juice of several varieties into the conjunctival sacs of rabbit's eyes and scored the amount of irritation by the scale of Draize, Woodard, and Calvery.[9] With smaller quantities, irritation was limited to the conjunctiva, being evident in a few minutes, reaching a maximum in 24 hours, declining by 48 hours, and being negligible by 168 hours. The varieties tested in decreasing order of their power to produce irritation were: *D. seguine, D. picta, D. Oestedii, D. Pitterii,* and *D. Amoena.* After instilling only 0.2 cc. of the expressed juice of an old stem of *D. seguine* into rabbit's eyes these authors observed a marked redness along with a severe chemosis and a muco-purulent discharge reaching its maximum in 24 hours and declining by the fourth day, but the entire cornea became opaque, resulting in permanent blindness.

Everett,[10] quoting from the original edition of Philip Miller's dictionary, writes: "The whole of the plant is filled with a sharp acrimonious juice which will blister tender skin if applied to it . . ."

On handling the plants, Barnes[4] experienced a rather severe burning and itching of the skin of the hands, along with occasional blistering. The burning sensation was little alleviated even when the hands were washed immediately after coming in contact with the juice, and the burning sensation lasted 12 to 24 hours.

According to Lindley,[23] Dr. Patrick Browne in *The Civil and Natural History of Jamaica* says that the stem of dumb cane is employed in the West Indies to bring sugar to good grain, when the juice is too viscid and cannot be made to granulate properly by the application of lime alone.

In the past, *Dieffenbachia seguine* was employed for various and sundry ailments. Sloane,[32] a physician, reports on its medicinal properties as follows:

> . . . Besides, the first qualities, being of very small parts, and opening obstructions, Formentations are made of them against Inflammations and Obstructions of Hypochondres and Reins; and the Oil is good against those evils, and supplies that capers, and *Lilies.* The Roots sliced and boiled in Wine, made into Baths, and used to the Feet, it is of great use against old and late Gouts.

And Hughes[19] comments:

> . . . if the narcotic Quality could be corrected, it might perhaps, be of great Use in Physic; for it hath been experienced, that several poisonous Plants, whose Juices were properly corrected, and exactly dos'd, have been successful Remedies.

A Physician, who accompanied the Duke of Albemarle formerly to Jamaica (Sloane), says that the Juice of the Dumb-Cane, mixed with a certain Portion of fresh Fat, is a sovereign Remedy in Dropsies, externally used, by rubbing the Part affected with this Ointment.

Present-day therapeutic usage seems confined to the field of homeopathic medicine where it is recognized in *The First Supplement to the Homeopathic Pharmacopoeia of the United States,* published in 1938, as *Caladium seguinum.*[7] It was introduced into homeopathy by Dr. Hering in 1832 and is still retained in their official publication. Directions are included for the preparation of the tincture, which is prescribed in minute doses for sexual impotence and frigidity.

The reports that *Dieffenbachia seguine* produces sterility is one of the most interesting and unusual aspects of its action. Madaus[24] states that this plant has been used by the Brazilian Indians as a means of sterilizing their enemies, the juice being administered either in food or as an arrow poison. He further reports that a tincture of the plant is effective against pruritis vulva and states that a decoction of the leaves is sometimes employed as a gargle.

Professor R. A. Howard[18] assures us that it is still a common belief among the inhabitants of many islands of the Caribbean that a temporary male sterility of some 24 to 48 hours' duration is effected by chewing *Dieffenbachia seguine* and it is thus employed by them as a contraceptive. It is interesting to note that Howard quotes these people as saying that the burning sensation encountered when first initiated to the plant largely disappears or goes unnoticed after continued usage for this purpose. Howard has personally had the story of this use verified on the islands of Dominica, St. Lucia, Guadeloupe, Puerto Rico, Dominican Republic, and Cuba. Watkins[38] in his book, *Gardens of the Antilles,* mentions that *D. seguine* may be found planted outside bedroom windows in the Caribbean, but that he was unable to determine the reason behind it.

Madaus and Koch[25] reported that the administration of 0.5 cc. of freshly expressed juice of *Dieffenbachia seguine* either orally or subcutaneously to male and female rats produced sterility. Male animals were rendered sterile after 40 to 90 days. Females were found incapable of reproducing after only 30 to 50 days' treatment. The *Dieffenbachia* extract by either route of administration proved equally effective. On histological examination they found complete or partial atrophy of the entire male or female genital

apparatus, along with a complete stoppage of spermatogenesis and follicle formation. They compared these changes to those produced by castration.

There is no reasonable doubt that certain members of the Third Reich in Germany, attempting to produce mass sterilization of undesirable races, employed *Dieffenbachia* juice in sterilization experiments on concentration camp inmates.[33] These experiments were limited by the unavailability of the *D. seguine*, which Koch was attempting to grow on a large scale in hothouses.[34]

Dr. Helmuth Wesse,[35] Director of the Pharmacological Institute of the Medical Academy in Duesseldorf, in an affidavit presented before the Military Tribunal in connection with the Nuernberg trials evaluated the work of Madaus and Koch:

> . . . The investigations show abundantly that a considerable number of animals treated perished from the poisonous effects of caladium extract. The extract therefore has no specific effect on the reproductive system. It is still completely unknown whether these harmful secondary effects are due to an element in the extract or some kind of accompanying ingredients.

In the opinion of Dr. Fredrich Jung,[36] lecturer at the Pharmacological Institute of Wuerzburg University:

> The findings of Madaus and Koch in their work "Studies in Animal Experiments concerning Medicinal Sterilization by Caladium Seguinum" are certainly valid, but they do not prove anything with regard to a specific sterilizing effect of caladium seguinum; they are rather to be accepted as part of the general poisonous effect of the caladium extract. . . . The symptoms on the sexual glands of the experimental animals are only a reversible partial symptom of a long lasting, almost fatal, serious injury to the entire organism, and have no connection with an actual sterilization or castration.

Fox and Barnes[13] fed albino rats the expressed juice of *D. picta* in doses of 5.0 cc. per kilogram of body weight daily for two weeks. The rats lost 24.2 per cent of their initial body weight in this time, while the control groups gained 12.8 per cent in the same period. No gross or microscopic pathological changes could be found in the sacrificed animals except slight congestion of the kidneys. There were no changes in the spermatogonia or the spermatocytes under these conditions of poisoning. Based on average weight loss of albino rats fed 0.25 cc. of expressed juice of several varieties for four doses spaced over two weeks, the decreasing order of toxicity was: *D. seguine, D. picta, D. Oestedii.* After withdrawal of the juice the animals regained their original weights in periods varying from one to two weeks.

Animals which were force-fed expressed juice or extracts (cold water, boiling water, alcohol, or acid) until symptoms of acute poisoning developed, manifested salivation, lacrimation, depression, slowing of pulse, depressed respiration, and occasionally tonic convulsions ending in death. The immediate cause of death was respiratory depression. The heart was still beating when respiration failed.

These authors made no suggestions covering antidotes or treatment. Nor are there any suggestions of antidotes in the literature since Richard Ligon[21] wrote in 1673: ". . . and whosoever chews it and sucks in the juyce, will have his tongue, mouth, and throat, so swell'd as to take away the faculty of speech for two days, and no remedy that I know but patience."

The mystery of the nature of the toxic constituents of *Dieffenbachia* still remains unsolved. Several varieties of these plants are common house plants, especially in southern United States. In more northern climates their culture is more or less confined to conservatories and greenhouses. There is some interest among horticulturists in developing less toxic variants.[12]

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The Elder Spence, William Combe, and John Hunter

Sidelights on Eighteenth-Century Dentistry and Hunter's *Natural History of the Human Teeth*

LLOYD G. STEVENSON*

OF John Hunter's first book, *The Natural History of the Human Teeth,* Robert Blake expressed the view that its "ingenious and valuable observations" did not inspire implicit confidence, "as many of them were collected from dentists of his acquaintance." Hunter himself "did not confine his operations to that part of medical surgery."

Blake went on to say, however, that the famous *Natural History* was "the only treatise of consequence in our language" up to the end of the century.[1] This statement perhaps needs qualification. For example, a new and enlarged edition of a work on dentistry already well known, the *Treatise* of Thomas Berdmore, Member of the Surgeons' Company and Dentist in Ordinary to His Majesty, had appeared in 1770,[2] the year before Hunter's *History.* Yet the paucity of dental literature was obvious enough. Berdmore had written in his preface: "The work being originally designed for artists, *who are not much given to reading,* and for patients who do not love too much trouble, I purposely avoided quotations. Indeed, without departing from the subject, I could only have quoted a few French authors, who have written *to make their names known,* and one or two English, who have translated very injudiciously."[3] Berdmore's *Treatise,* enlarged, consisted of only 279 pages, of which nearly a hundred were devoted to oral hygiene.

Hunter contributed to the scientific basis of dentistry by his anatomical studies. On the evidence of his worst enemy, Jessé Foot, he may have done something in addition to alter the social

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1 Blake, Robert. *An essay on the structure and formation of the teeth in man and various animals.* Baltimore, 1848, p. x. (Original edition, Dublin, 1801).

2 Berdmore, Thomas. *A treatise on the disorders and deformities of the teeth and gums. . . .* A new edition with additions. London, 1770. The italics in the quotation are in the original.

3 *Ibid.,* p. vi. This is, of course, misleading. The "few French authors" included the "Father of Dentistry," Fauchard, whose famous *Chirurgien Dentiste* appeared in 1728.

and professional status of the English dentist by his association with those of his acquaintance whom Blake thought to be the chief sources of his knowledge. What he learned from contemporary dentists must be looked for principally in the second, and less impressive, part of his work on the teeth.[4] It is well known that one, at least, among the practising dentists of London was for some years closely allied with the great surgeon. The nature of the connection shows that Hunter had personal knowledge of dental practice, however much or little he may have done with his own hands, and that he did not pick up what he knew about it in quite so casual a way as Blake, and others, would imply.

Blake's criticism calls for two further comments. First, as far as it relates to practical dentistry, it is doubtless largely justified: dentists and historians of dentistry have usually been little impressed by this aspect of Hunter's work. Second, Blake's attitude reveals the growth of specialism.

Although mountebank tooth-drawers had existed from of old, dentistry had continued as a part of general surgery. It is true that surgery and dentistry had not been inseparable in the past. Some dentists had been members of the old United Company—for example "John Brysket toothe drawer" was admitted a brother in 1551[5] —but it had been quite clear at least as early as the time of Henry VIII that they, like the barbers, were inferior to true surgeons. They were, indeed, more closely linked with the barber, for the latter had been forbidden to "occupy any Surgery, Letting of Blood, or any other Thing belonging to Surgery, Drawing of Teeth only except."[6] An inferior sort of specialist had thus held the stage for a long time. When Hunter appeared on the scene, a more securely founded specialism, of which Berdmore may stand as the example, was only beginning. The King's Dentist in Ordinary, who devoted his full time to the art, drew a sharp distinction between the "Surgeon-Dentist," prototype of the modern dental surgeon, on the one hand, and "the Tooth-drawing Barber and

[4] Hunter, John. *A practical treatise on the diseases of the teeth; intended as a supplement to the natural history of those parts.* London, 1778. The *Natural history* of 1771 was reissued in 1778, with the *Practical treatise* as a second part. For the various editions and translations, see W. R. Le Fanu, *John Hunter: A list of his books.* Cambridge, 1946, pp. 7, 9.

[5] South, J. F. *Memorials of the craft of surgery in England.* D'Arcy Power, Ed. London, 1886, p. 108.

[6] *Ibid.*, p. 256, n. 2. This incidentally shows that the union of barbers and surgeons in the same guild did not mean that they were identical. Distinctions existed from the foundation of the United Company and became more and more marked; barbers took no part, for example, in the questioning of surgical candidates. The long existence of the United Company and the prevalence of the term "barber-surgeon" are to this extent misleading. Cf. *ibid.*, pp. xi-xiii.

itinerant Mountebank" on the other;[7] this was comparing a gill to a gallon, for the surgeon-dentists were few indeed. At the same time, dentistry had not vacated its place in general surgery. If most of the great London surgeons could afford to neglect it, their humbler brethren could not—dental forceps were among their necessary tools.

Late to establish itself as a respectable profession in Britain, dentistry was hardly yet recognized as such when the *Natural History* appeared; it was growing more distinct and more self-conscious by the time of Blake's *Essay* with its criticism of Hunter. An earlier age than Hunter's would have been puzzled by the stricture regarding specialism; a later age than Blake's was not to find all dentistry in the hands of full-time dentists. Both surgeons and apothecaries were to keep their grip on the dental forceps for generations to come, particularly in the provinces.[8] Blake meant, of course, that only a "specialist" should write a book, but specialists of the requisite type had been almost non-existent when Hunter's book was written.

More respectable biographers tell us little about Hunter's relations with the dentists; Jessé Foot tells us much, because he considers the information damaging to Hunter. The details preserved in this way have by now quite changed their aspect. George C. Peachey, and more recently S. Roodhouse Gloyne and Ernest A. Gray,[9] have made some use of this material, but I think it is not unfair to say that they have borrowed from it chiefly for "color" and amusement; this seems true, at any rate, of Gloyne and Gray. The present recapitulation will differ from theirs in selection and emphasis.

When Hunter returned from the Army and set up for himself in London, the practice of surgery, according to Foot, afforded no opening for him. "Hawkins, Bromfield, Sharpe, and Pott, embraced almost the whole of family practice; whilst Adair and Tomkins carried from him the chief of the practice derived from connections formed in the army."[10] Not taking into account cases

7 Berdmore, *op. cit.*, p. 5.

8 Bell said of Joseph Fox that his work was a "valuable acquisition, not to the professed dentist only, but particularly to the general practitioner; a class of the profession to which his labours were especially devoted, as he lectured on this subject for many years in the theatre of Guy's Hospital." Hunter's *Works*. Palmer, Ed., II, p. xv.

9 Peachey, George C. *A memoir of William and John Hunter*. Plymouth, 1924, p. 143. Gloyne, S. Roodhouse. *John Hunter*, Edinburgh, 1950, pp. 66-67. Gray, Ernest A. *Portrait of a surgeon: a biography of John Hunter*. London, 1952, pp. 61-62, 66. Peachey cited not only Foot's biography of Hunter, but also an anonymous tract of 1793 which he believed was written by Foot.

10 Foot, Jessé. *The life of John Hunter*. London, 1794, p. 83.

sent up from the country, this seems a meagre allowance of surgical aid for the population of the metropolis.[11] It must be admitted that standards of surgical care were undeveloped, and perhaps relatively fewer surgeons—in anything approaching the modern sense—were called for. It must also be admitted that Foot undoubtedly refers only to practice in the fairly well-to-do segment of the populace; without question the majority sought their surgical attendants among inferior practitioners and quacks. Even so, it is difficult to believe that six surgeons could engross the whole of the paying surgical practice. Peachey, who thought that a large part of Hunter's income between 1763 and 1768 was derived from dental consultations, mentioned half a dozen of his contemporaries, including his well-known rival, Gunning, who were rising in practice at this period. Operative surgery was much more limited than it is today; but surgery was also, in a sense, much broader, for even at the high level eventually attained by Hunter it included a great deal that would today be called general practice. Syphilology and dermatology were also within the surgical domain, even up to the time of Jonathan Hutchinson, who was born just a hundred years later than Hunter. Furthermore, surgical diseases and injuries were not only common but were more likely to be chronic in their effects because of the limitations of therapy. This is not to say, however, that the evident need for surgeons made it easy to establish a new practice in London. The point has been briefly discussed only to reduce a little the element of exaggeration found on every page of Foot's *Life*. In short, it was not necessarily the economic motive alone which turned Hunter's attention to dentistry, as Foot goes on to infer.

> John Hunter, at the time he published this book, had but very little practice; the whole circle being then filled up by names to which I have before alluded. Independent of his half pay as an army surgeon, his whole support depended upon professional emolument. It is not to be wondered at therefore, that when the common field of practice was already stocked, and its pasturage short, a man of his mental resource and active application, should be directed in search after fresh ground, where he could by himself range at large.[12]

What Foot has to say about the difficulty of starting up in surgery is doubtless true, if a little overemphasized; in any case, the

11 Cf. George, M. Dorothy. *London life in the eighteenth century*. New York, 1925, p. 329, n. 5. Arnold Chaplin. *Medicine in England during the reign of George III*. London, 1919, pp. 133, 134.

12 Foot, *op. cit.*, p. 131. Adams thought that Hunter's practice was slow in growing; although he did not suggest that the dental consultations were mercenary, he thought the need for money determined the publication of the *History*. Cf. Adams, Joseph. *Memoirs of the life and doctrines of the late John Hunter, Esq.* 2d ed. London, 1818, p. 68.

field which Hunter now chose to enter was not really unoccupied either, and he could hardly "by himself range at large." None the less it is the passage following this to which I invite particular attention.

> In this motive, he followed in some measure the practice of the French surgeons, but it was directly against the habits of the English. Hawkins, Bromfield, Sharpe, and Pott, were proud and unaccommodating professional men. They were above submitting to consultations with dentists. Their patients who wanted advice for relative complaints of the teeth, sent for or went to them, and from them took the instructions which dentists were to obey. Such was the rude and gothic state of practice, when this motive offered to John Hunter.
>
> He laudably condescended to accommodate himself to the necessity of the case: — and to fill up this chasm in practice, thus proudly kept open till now, he placidly attended on fixed days and hours at the house of a dentist, — to aid him by consultation for the benefit of his patients. But few are amongst the happy favourites of fortune! John Hunter was not found to bestow his smiles upon every dentist; — his sincerity in friendship confined him alone to the family of the Spences.[13]

Before turning to the Spences, it may be well to observe that while surgeons required the service of dentists, dentists might also need surgical or medical aid. Berdmore observed that the treatment of toothache sometimes involved bleeding and purging, "nitrous draughts," the application of blisters for revulsion, and the exhibition of opium. "But for the well-timed and judicious application of such methods, a physician or surgeon should be consulted. For he who wanders beyond the *Limits* of his profession, is subject to errors which never are forgotten; or his advice, however judicious, fails of due respect, and always goes unrewarded."[14] It is open to doubt how frequently the dental "artists" felt themselves incapable of bleeding, blistering, and drugging. The *Limits* of professional practice were probably seldom clearly marked.

The elder Spence, a Scot, had established his business as a barber and tooth-drawer in Gray's Inn Lane, where Foot went to have a tooth pulled in 1762.[15] Spence was already well known: "There was no one so high in fame for extracting teeth as the elder Spence." His shop was well appointed and "exquisitely neat." What is more, "the civility of Spence was beyond all expression." Foot says nothing about the extraction, except that as a surgeon's

13 Foot, *op. cit.*, pp. 131-132.

14 Berdmore, *op. cit.*, pp. 40-42. Cf. Hunter, *Works, II*, pp. 57-58: "All the diseases of the teeth which are common to them with the other parts of the body, should be put under the management of the physician or surgeon, but those which are peculiar to the teeth and their connexions belong properly to the dentist."

15 Foot, *op. cit.*, pp. 133 ff.

apprentice he was not charged for it, although he compensated the dentist by giving him a hare. Spence was something of a philosopher: that is to say, he took an interest in natural science. One feels that Foot was much impressed at the time by the electrical machine with which Spence entertained him ("by the dancing of figures,—ringing of bells,—attraction of hair and feathers—and firing gunpowder") and that his sarcasm on this subject was of later growth. Spence afterwards moved to what Foot calls the best house in Soho Square. By his coalition with Hunter "he found an alteration in the nature of his practice: he was not only to dispossess the rotten tenants of their mansions, but was now engaged in adorning the sound ones—in arranging those which intruded upon each other—in filing, cleaning, polishing—and at length in transplanting."

> The coalition was formed without difficulty betwixt two men, who laudably aspired in their distinct provinces;—who were born in the same country,—and who were much upon a par in their education; and the mutual interest promised to create, gave vigour to that scheme, in which John Hunter more than Spence was to be exalted.
>
> John Hunter was to produce this work, which would authorize Spence to introduce him as a chosen surgeon best acquainted with diseases of the teeth and jaws, because he had written a *learned treatise* upon them, and had made them his favoured study. Spence soon found his house crowded by all the fashion of the age: the stock of beauty even to this day has experienced an encrease by their consultations: and had it not been for a few unfortunate cases, where by transplanting of teeth the venerial disease was conveyed, and where patients thereby fell victims to that poison, in all probability neither of them would have been disgraced by the connection.[16]

Anyone who wrote a medical book laid himself open to the charge of "puffing" for practice. Berdmore, after all, had sneered at "French authors, who have written *to make their names known.*" As for transplantation, the subject was already controversial. Berdmore thought the practice "not only precarious, ineffectual, and dangerous in general, but also immoderately expensive," and believed that many of the successes claimed were simply cases of fraud; he named no names.[17] The transmission of venereal disease by this means was commonly reported and discussed.[18]

One of Spence's fashionable patients was another Scot, James Boswell. On Thursday, 6 May 1773, Boswell wrote in his journal:

[16] *Ibid.*, pp. 136-137.

[17] Berdmore, *op. cit.*, pp. 102-103.

[18] Cf., e.g., Stevenson, Lloyd G. The siege of Warwick Lane. *J. Hist. Med.*, 1952, 7, 119. Rowlandson's pictorial comment on transplantation is reproduSed by W. Born, The nature and history of medical caricature, *Ciba Symp.*, 1944, *6*, 1939.

"Toothache easier. Went to Spence: two stumps drawn and teeth cleaned; agreeable to see thing well done."[19] The testimony of a grateful patient is worth recording as a counterpoise to Foot's heavy sarcasm.

What has Hunter to say about Spence? So far as I can find, he mentions him only once. Significantly—as showing where Spence comes into the picture—this is in a footnote to a passage in Part II of Hunter's work, that part which deals with diseases of the teeth and the operations of dental surgery. Having cautioned against quick, violent extraction, particularly in adult cases, Hunter adds: "I must do Mr. Spence the justice to say, that this [presumably the slow, steady] method appears to be peculiar to him, and that he is the only operator I ever knew who would submit to be instructed, or even allow an equal in knowledge; and I must do the same justice to both his sons."[20] This could mean that Hunter had learned the point from Spence, who in other respects was willing to be taught; or it could mean that Spence had learned it from Hunter, other operators proving too opinionated in this as in other matters. The name, Spence, is associated with a type of extraction key; but I have not ascertained whether the designer of this instrument was "the elder Spence" or another.[21] Hunter apparently had no strong objection to keys. "It would be best of all to attempt the extraction of a tooth by drawing it in the direction of its axis, but that not being practicable by the instruments at present in use, which pull laterally, it is the next best to draw a tooth to that side where the alveolar process is weakest."[22] However this may be, cautioning against hasty extraction was nothing new. Turning once again to Berdmore, we find him quite as explicit on this point as Hunter, and rather more concerned over fractures of the alveolar process; he also appears to condemn the use of keys, although not in so many words.[23]

Hunter's footnote is seized upon by a smirking Jessé Foot as an evidence of—I think he also implies an advertisement for—the shameless confederacy of Hunter and Spence.[24] Incidentally, it

[19] *Private papers of James Boswell from Malahide Castle in the collection of Lt.-Colonel Ralph Heyward Isham. . . .* Geoffrey Scott and Frederick A. Pottle, Eds. (Mount Vernon, New York, 1928-34. 18 vols.), *6*, p. 132.

[20] Hunter, *Works, II*, p. 95 n.

[21] Cf. Bell, Thomas. *The anatomy, physiology and diseases of the teeth.* 2d ed. London, 1835, p. 291.

[22] Hunter, *Works, II*, p. 54; cf. *ibid.*, pp. 94-97.

[23] Berdmore, *op. cit.*, Chap. IX, pp. 104 ff.

[24] Foot, *op. cit.*, pp. 132-133.

appears to show that even in the infancy of their art, dentists too could be "proud and unaccommodating professional men."

I do not wish to overstress the social meaning of the Spence-Hunter compact; but as an established and long-continued arrangement, it perhaps meant more than would be supposed from Hunter's willingness to meet in consultation with Plunkett, Taylor of Whitworth, and other quacks—"I have no objection to meet anybody."[25] Dentistry in its scientific aspect Hunter was helping to create. First, however, he elevated one London tooth-drawer to the rank of a respectable dentist, not only by what he taught him, but also by the degree of prestige he conferred on him through extended association; this despite the fact that his motive, apart from business, was doubtless less to teach than to learn, less to give than to get the benefit of collaboration.

II

It is notorious that Hunter's works are hard to read. Praising his "comprehensive and original genius," Buckle declares his "only fault was, an occasional obscurity, not merely of language, but also of thought. . . . It sometimes seemed as if the understanding was troubled by the grandeur of his own conceptions, and doubted what path it ought to take. He hesitated; the utterance of his intellect was indistinct."[26] This, I think, is nearer to the truth than the view that Hunter's obscurity, like his errors in fact, should be blamed on his lack of education.[27] With the exception of Joseph Adams, who praised his hero's peculiar terminology,[28] few have been found to defend John Hunter's writing.

"The truth is," so we are told by Foot, "that he only furnished the images, and that the writing part was always performed by another:— he prepared the skeleton, and another covered it with composition:— he found the materials, and another made them up into dresses for the public."[29] Although Foot asserts that "all the

25 Paget, Stephen. *John Hunter: man of science and surgeon.* London, 1897, p. 168.

26 Buckle, H. T. *History of civilization in England.* London, 1885, *III*, p. 428.

27 Cf., e.g., Garrison, F. H. *An introduction to the history of medicine,* 4th ed., Philadelphia, 1929, p. 347.

28 Adams, *op. cit.*, pp. 54-58; but cf. *ibid.*, p. 13, with reference to Hunter's school days: "Had Mr. Hunter availed himself less of maternal tenderness, his style might have been perspicuous, easy, and full of force, without losing any of its accuracy." Particular innovations in terminology were sometimes praised by those who approved their doctrinal basis. For example, Blane (apparently one of those who gave Hunter editorial help) wrote that "Mr. Hunter by a happy turn of expression, calls the function of the nervous system *internuncial.*" Blane, Sir G. *Elements of medical logick.* 3d ed. London, 1825, pp. 132-133.

29 Foot, *op. cit.*, pp. 59-60.

attacks, and all the replies of the Hunters, which gained so willing an admittance into the Critical Review . . . were revised, corrected, and published under the immediate eye, influence and direction of Smollet,"[30] he does not otherwise indicate, at least in his *Life,* who may have assisted in the work of composition.

While the second edition of the *Treatise on the Venereal Disease* was in preparation, Hunter is supposed to have written to a friend: "In order to render the language intelligible I meet a committee of three gentlemen, to whose correction every page is submitted." According to Babington, the three gentlemen were Blane, Fordyce, and Pitcairn, to whom a Mr. Marshall was afterwards joined.[31] On this theme, too, there is word from Foot who was, in his way, the most devoted of all Hunterians. The late Sir D'Arcy Power possessed a copy of the scarce first edition (1817) of the Hunter *Memoirs* by Joseph Adams, with manuscript annotations by Foot; this volume is now in the library of Mr. Geoffrey Keynes, to whom I am much obliged for the opportunity to examine it. On page 235 Adams wrote: "His [Hunter's] work on syphilis, it is well known, was examined by a number sufficient to be termed a committee; and it is certainly the worst written and the least intelligible of all his performances." To this Foot adds his comment as follows: "Why was it so? because after his friends Sir G. Baker & still more Dr. Pitcairn, who had taken great pains to make himself master of his peculiar opinions, had corrected the MS so as to make it readable, Mr. H. could not comprehend it in any other words than his own, & his own were incomprehensible to any one but himself."

If Hunter took such great pains with his *Treatise on the Venereal Disease,* may we not conjecture that he too was anxious for the intelligibility of his other works, and that he sought help to ensure it? One might suppose his first book, *The Natural History of the Human Teeth,* to have given him particular concern, even though it dealt with matters less obscure than his "peculiar opinions" of later date.

In May, 1820, a young physician named Lefevre returned to London from a journey abroad. Soon afterward he had the pleasure of a strange encounter with the past.

[30] *Ibid.,* p. 61. Cf. Knapp, L. M. *Tobias Smollett: doctor of men and manners.* Princeton, 1949, pp. 202 *ff.,* 204, n. 40.

[31] Babington, George G. *Hunterian oration,* 1842, cited by Holmes, T. *Introductory address delivered at St. George's Hospital, October 2, 1893, on the centenary of John Hunter's death.* London, 1893, p. 43.

"You must write a book," said the old gentleman to me, just as he awoke from his nap in the back parlour. "I want to see you write a book. Where are the young ladies?" And he took a pinch of snuff, and yawned again in his chair. "You may make it extremely interesting, and any of your friends will give it a dash of science for you. The mineral springs in Germany are good food for a physician, and they are of as much service to him at home as abroad." When I was told that I must write a book, and that it would be extremely interesting, I began to think that I had more talent than I was aware of. I replied, however, modestly, that my peregrinations had extended only to one foreign country, and I could not well write upon the German springs unless I had really visited them. "No necessity in the world," he replied, "for leaving the city; you will find every thing that you want without going a mile from your own door." He then gave me such instructions upon the subject as almost made me believe I had been on the spot, which he told me how to describe.

"A young physician must publish himself into practice," he continued, "or he will find it an uphill concern. I have helped more than one in this way. Nay, John Hunter was the worst writer that ever took a pen in hand. I wrote his essay on the teeth for him, and it was a hard job too: for not only could I not understand him, but he evidently did not comprehend his own meaning. It was an Herculean labour to him to compose a sentence, and a week's work to make it intelligible and yet he was a most extraordinary man, and the most laborious one I ever knew. I cannot necessarily know anything of his medical reputation, but I believe that it stands very high."[32]

The old gentleman and the author next entered into a metaphysical discussion on Hunter's theory of life and on the current dispute about it between Abernethy and Lawrence. The young ladies of the household returning, the old man was served with gooseberry pie and custards. He ate eleven custards and as much of the pie as the custards could cover.

And who was this old man, so fond of metaphysics and gooseberry pie? . . . It was the author of "Dr. Syntax," who visited in the family where I then resided. . . . He often brought us his manuscripts of Syntax's Tour, to read, as he took them to the printer's, and always insisted upon it, that he had not the slightest idea, nor even taste, for poetry.

The creator of "Dr. Syntax" was William Combe (1741-1823), a prolific journalist, versifier, and publisher's hack during half a century of almost constant insolvency.[33] In his youth, however, he had cut a fine figure in London society and had lived with the

[32] Lefevre, Sir G. W. *The life of a travelling physician.* London, 1843, *I*, pp. 78-83.

[33] I have used two sources for most of my information about Combe. (1) Combe, William. *Dr. Syntax's three tours: in search of the picturesque, consolation, and a wife . . . with the life and adventures of the author.* . . . by J. C. Hotten. London, n.d. [1868]. (2) Hamilton, H. W. William Combe: a dissertation presented to the Faculty of the Graduate School of Cornell University for the degree of doctor of philosophy, September, 1934 (unpublished). Cf. also *D. N. B.* Neither Hotten nor Hamilton has noticed the passage here quoted from Lefevre.

splendor of a prince. Born in Bristol of a better than well-to-do family, Combe had come to the end of his resources, reputedly some £16,000, "by about 1768" according to Hotten—"by the end of 1770, or shortly thereafter" according to Hamilton. Although the interval before his ultimate adoption of hack writing as a means of livelihood is supposed to have been occupied by service as a soldier, elocution teacher, cook, and waiter, the events of his life at this time are really little known. "That Combe led a precarious sort of existence between 1770 and 1774 cannot be doubted, but all the various stories related of this period must be read cautiously."[34] It seems clear that he enlisted as a private in the Army and that in the spring of 1771 he was billeted in Wolverhampton. If this date is correct (Hotten says that he settled in London about 1771), and if he had before this assisted Hunter with the manuscript of the *Teeth*, it follows that his first experience of ghost writing had not encouraged him to continue, although it is of course possible that he was unable at this time to find other commissions of the same kind. In view of the great uncertainty which besets his biographers in dealing with this period of his life, it is beyond finding out whether or not Combe was in London when the *Natural History*, published in 1771, was being written.

Once settled in the metropolis, he applied himself to literature and became the author of innumerable satires, political pamphlets, broadsides, sermons, biographical sketches, articles for newspapers and reviews, memorials to public boards—in short, of hack writing of every conceivable kind. He was active as a translator, compiler, and editor. In the latter capacity his most important job was the compilation of Sir Alexander Mackenzie's *Voyages* from the explorer's notes. Combe is best remembered, however, as the author of the doggerel verse in the three "tours" of Dr. Syntax, written for Ackermann to accompany the drawings of Thomas Rowlandson. His income from all his labours never caught up with his debts and expenses. Having piled up very large debts in his hey-day, Combe lived from about 1780 until his death in 1823 "within the rules" of the King's Bench Prison.[35]

34 Hamilton, *op. cit.*, p. 27.

35 By virtue of the so-called "Day Rule" it was possible to purchase for four shillings the privilege of going to London for the day; for a sum which varied according to the amount of one's indebtedness (£10 for the first £100 indebtedness, and £4 for each additional £100) one might "obtain the benefit of the rules" and live anywhere within a radius of three miles of the prison. Hamilton, *op. cit.*, p. 103, citing [Combe, W., Ed.] *The life, adventures and opinions of Col. Hanger*, 1801, *II*, pp. 306-307, 323.

William Combe (1741-1823)

From a drawing by George Dance, dated 7 December 1793.

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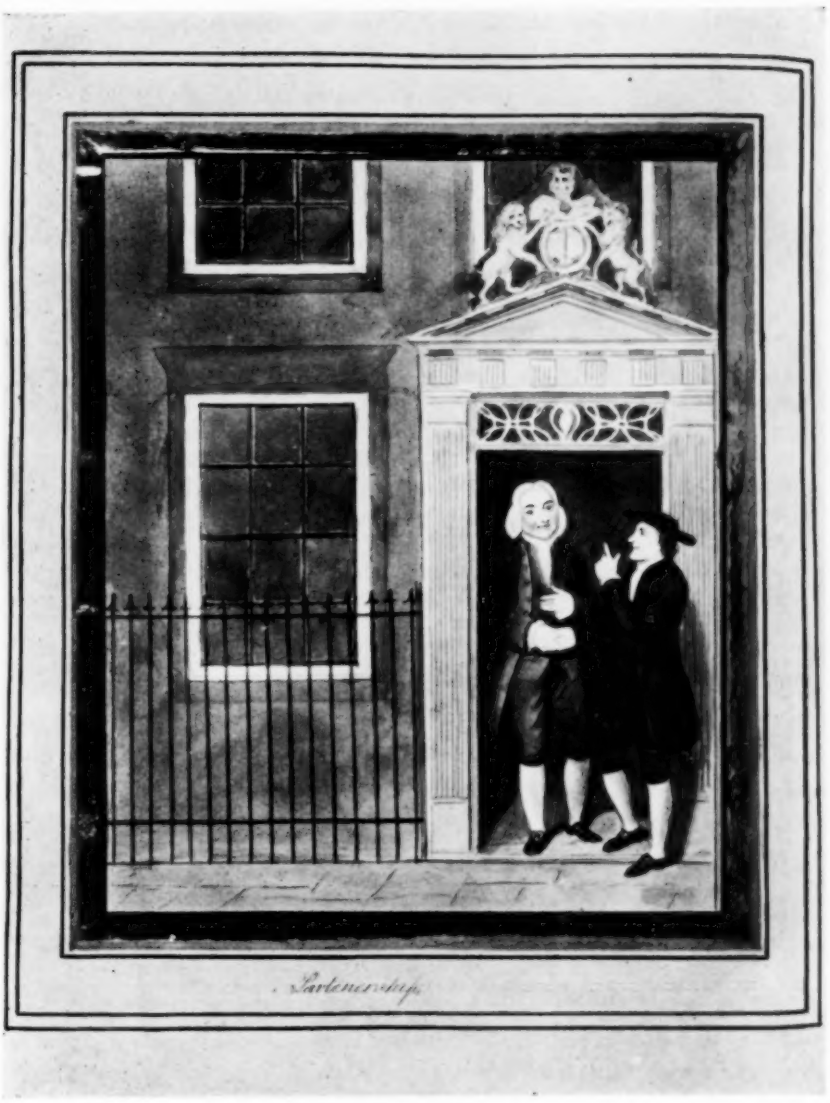
"The original Spence of Gray's Inn Lane"

Artist unknown. From Jessé Foot's extra-illustrated copy of his *Life of John Hunter* (vol. I, p. 290) in the Wellcome Historical Medical Library.

(Reproduced by kind permission of Dr. E. Ashworth Underwood.)



"Partnership"

Artist unknown. From Jessé Foot's extra-illustrated copy of his *Life of John Hunter* (vol. I, p. 301) in the Wellcome Historical Medical Library.

(Reproduced by kind permission of Dr. E. Ashworth Underwood.)

His works were anonymous, or were published under a dozen different aliases, to avoid legal attachment of the profits. In addition to executing other literary chores, Combe was the ghost writer, or editorial assistant, of a number of contemporary authors. Of Adam Anderson's *Origin of Commerce*, 1787-1801, Combe asserted that "the first three volumes [were] corrected and enlarged, and the whole of the four volumes compiled, arranged, and written out by me."[36]

> I could also name some works of no inconsiderable size and reputation in which I have been sought to act as pioneer by clearing away what appeared to me to be superfluous, to be entrusted with the task of improvement, either as to mode or to matter, to render reasoning more perspicuous, and to strew the path of truth with flowers. Of this I have been thought capable by those whose favourable opinion in any branch of literature would justify a rational pride; but such labours must be confined to my own bosom, and these works, in which I should be glad to acknowledge my share of the labour, and they are not a few, must be *nameless*. Such was the actual or implied condition of the remunerations I received from those whose names they bear, or to whom they are attributed.[37]

Combe also says, "I had not the assistance of a *dot* to an *i* from any amanuensis," but this claim has the preliminary qualification, "as near as it may be thought possible." According to the *Cambridge History of English Literature*, he dictated much of the verse for Ackermann; but Lefevre had seen parts of the manuscript of the second *Tour*, and it seems unlikely that this or the other *Tours* were dictated, as Harold Child suggests, directly to an emissary of the publisher to be carried off at once to the printer. This, after all, is the sort of tale which is told of more than one prolific author to illustrate his alleged facility.

On the strength of Combe's declaration that he had no help from an amanuensis, I have thought it worth while to examine the manuscript of the *Natural History* in an attempt to decide whether or not the handwriting is his.[38] This manuscript (Royal College of Surgeons of England, 49. d. 1) is not a transcript of the printed book, for the text is clearly preliminary to the printed version. It is a draft in a scribe's hand, worked over and emended in Hunter's characteristic script. Many of the corrections appear to have been made in pencil and inked over. This ink-over-pencil writing sometimes gives the impression, particularly in photostat,

[36] Hotten, J. C., in the *Three tours*, p. xlii.

[37] Quoted by Hotten, *loc. cit.*, p. xlviii.

[38] It is a pleasure to acknowledge the generous assistance of Mr. W. R. Le Fanu, Librarian of the Royal College of Surgeons of England, who provided me with much of the information in this paragraph as well as with photostats of the manuscript.

of a third hand; in the original it seems clear enough that there are only two. As the proofs of the plates before lettering are also present, there can be no doubt that it is Hunter's own working draft. The writing of William Bell and that of William Clift are identifiable: neither of these was the scribe of the *Teeth*. The writing of John André (or Andree) and that of William Lynn have not been identified. Lynn probably joined Hunter in 1772, Bell in 1775, André in 1784, and Clift, best known of Hunter's assistants, only twenty months before the master's death.[39] If the scribe of the *Teeth* wrote any of the other Hunterian manuscripts, the fact has escaped notice.

Unfortunately, no specimen of Combe's handwriting at the period of the *Natural History* is known. Apparently the earliest yet discovered is a short autograph letter, dated 22 March 1797, in the Bodleian Library (MS Montagu. d. 6). This I have not seen. In the Pierpont Morgan Library there are two specimens, a promissory note for one hundred pounds made out to George Romney, signed by Combe, and dated 2 April 1798; and a letter to Romney dated 12 November the same year. A photostat of this letter of November 1798 has been compared with a photostat of the R. C. S. manuscript; for the same purpose, and to see how Combe's writing changed over the years, a photostat of a letter from the British Museum dated 5 December 1816 has also been used. I need not discuss the limited value of such comparisons. It is sufficient to say, for what it is worth, that the only conclusion to be drawn from the materials available is disappointing. It is considered highly improbable that the handwriting of the scribe of the R. C. S. is the handwriting of William Combe.[40]

If this finding does nothing to confirm Combe's assertion, neither does it show the claim unfounded. The draft at the R. C. S. may not be the only draft of the *Natural History;*[41] or Combe may have dictated to an amanuensis from notes of his discussions with Hunter, or even from Hunter's notes.

What of internal evidence, the evidence of style? Whereas Bell considered that "the work in question is perhaps the least felicitous effort of this extraordinary genius, and that of which the

[39] Cf. Peachey, *op. cit.*, pp. 186, 187, 189.

[40] For an expert opinion on this matter I am indebted to Mr. W. F. Marshall, Westervelt School, London, Canada.

[41] A fragment of what appears to be another draft, although in the same hand, is in the Wellcome Historical Medical Library; I am grateful to Mr. F. N. L. Poynter for finding this scrap of manuscript and having it photographed for me.

errors are the most obvious and striking,"[42] the *Natural History* has been singled out by others for particular praise. "To take a single instance," wrote Luther Holden, expatiating on Hunter's ability as a teacher, "I would especially point to his description of the organs of mastication and digestion. . . . When I first read it, it filled me with astonishment. 'Would to heaven,' I said, 'that we had the whole of anatomy described in this forceful way; we should hear fewer complaints of its dryness and dulness!' The language is so lucid, so terse, and withal so pictorial."[43] Holmes said of it: "His reasoning is usually as clear as his description is terse and luminous."[44] Of Hunter's works in general, Holmes had a poorer opinion: "There are passages of much force and beauty in his writings, his general style has distinction and power of its own, but he is often hopelessly obscure, and sometimes when his meaning is discoverable it is only after considerable puzzling."[45]

With the latter part of this comment most of Hunter's readers seem to find themselves in agreement. The terms applied by these orators to the *Natural History* ("so lucid, so terse, and withal so pictorial," "terse and luminous") appear, on the other hand, to be reasonably just, allowing a little for oratorical fervor. Is this relative superiority in the style of Hunter's first book due merely to the nature of its subject matter, or is something owing to the collaboration of Combe? The writings attributed with some certainty to Combe show no marked similarity in style to the *Natural History*. Here again, subject may be all; but if Combe's well-constructed, neatly balanced, eighteenth-century rhetoric is occasionally worth calling "luminous" or "pictorial," certainly it is seldom "terse." Of the evidence of style I can make very little, except that to my mind the writing of the *Natural History* bears a stronger likeness to the other works of Hunter than to anything I know of Combe's; but then, so far as I am aware, Combe "wrote" no other works in anatomy.

I am finally reduced to the admission that to believe in Combe as John Hunter's "ghost" one must rely solely on his unsupported statement as transmitted by Lefevre. Crabb Robinson records what he was told about Combe's autobiographical anecdotes: "You

42 Cf. Hunter's *Works*, II, p. xii.
43 Holden, Luther. *Hunterian oration*. London, 1881, p. 25.
44 Holmes, *op. cit.*, p. 30, n. 32.
45 *Ibid.*, pp. 42-43.

must believe nothing he says that is about himself."[46] The story is circumstantial. It is by no means improbable. Yet it remains unproved.[47]

All that can be said in the end is that two obscure and not very important men, the elder Spence, a tooth-drawer who was fond of curiosities in natural science, and William Combe, a publisher's hack who was fond of metaphysics and gooseberry pie, may have had their small parts to play in the beginnings of modern English dentistry.

[46] Robinson, Henry Crabb. *Diary, reminiscences and correspondence.* Thomas Sadler, Ed. London and New York, 1872, *I*, p. 154; quoted by Hamilton, *op. cit.*, pp. 9, 28. Cf. also Dyce, *Recollections of the table talk of Samuel Rogers*, 1856, p. 116.

[47] There is a possibility that Combe referred to the *Practical treatise* of 1778 as the book which he helped to write, but I think this is unlikely. From every point of view the second work was surely a less difficult one to prepare than the original *History*. Also, by the time it appeared, Hunter had been in practice for approximately fifteen years and did not fit the circumstances suggested by the context of Combe's assertion. In any event this possibility can hardly be checked, as the manuscript of the second part of Hunter's work has not survived.

Felice Fontana

From a medallion by S. Zucch

Felice Fontana: The Laws of Irritability*

A Literal Translation of the Memoir *De Irritabilitatis Legibus*, 1767; Added Material from *Ricerche Filosofiche sopra la Fisica Animale*, 1775; and Correlation of these Editions with the E. G. B. Hebenstreit German Translation, 1785

JOHN FELIX MARCHAND†
AND
HEBBEL EDWARD HOFF‡

Part I: Introduction§

THE naturalist, Felice Gaspar Ferdinand Fontana, child of a Tyrolean lawyer, was born at Pomarole on 15 April 1730. Schooled in literature and natural sciences at Verona, Parma, Padua, and Bologna, he served as tutor to the children of an Austrian general at Rome before being called, at the age of thirty-five, to the Chair of Logic or Rational Philosophy at Pisa by Grand Duke Francis. From the University of Pisa, where he prepared the treatise on muscular irritability, he was summoned to the Museum of Physics and Natural History at Florence. During his thirty years at this museum, the renown of the institution overshadowed his experiments. Garrison notes[46]: "The medical collection of the exhibit contained some three thousand specimens and twenty-four life-size statues, four each of the muscular and lymphatic systems, eight of the circulatory system, five of the nervous system, one each of the ligaments and the chyliferous system, and one gravida. The viscera comprised six hundred and fifty separate pieces; the brain fifty-five, and the nervous system, finest of all, over five hundred pieces. In addition, there were representations of all phases of

* This English translation is offered in order to make more accessible a contribution to our knowledge of the refractory period and related properties of heart and other muscle, again elucidated after more than one hundred years. The original texts for the translation were made available by John Farquhar Fulton whose books now form part of the Historical Library in the Yale University School of Medicine.

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§ Parts II and III containing the translations, together with the bibliography will appear in subsequent issues.

labor and obstetrics, of surgical operations, of mushrooms, and of plants." Technical displays included instruments of Galileo, Torricelli, and Viviani, and Fontana's own equipment: spirit levels, spider web sights for survey instruments, barometers, thermometers, pirometers (to measure solids), compass needles, a compensating pendulum, a divider of weights, a micrometer caliper, anemometer, hygrometer, balances, and a demonstration of assay methods for precious metals. Natural history was represented by fossils, woods, seeds, fruits, gums, resins, shells, birds, mammals, and reconstructions of the orbit, olfactory nerve, and ear.

The channels in the ciliary body of the eye which now bear Fontana's name were mentioned in a personal letter eighteen years before he allowed his discovery to be published as an appendix to the treatise on poisons.[31,32,45] Fontana micromanipulated red blood cells[14] and spores for evidence of compressibility, discovered lymphatic vessels in the crystalline lens of the eye, observed the neuraxon and sheath of Schwann, apparently before Remak and Schwann, recognized the nucleus as an essential part of the cell, used dye stains and glass coverslips for histological studies, investigated tapeworm cysts of the sheep brain,[34] confirmed Haller and Caldani's experimental evidence on retinal mediation of the pupillary reflex,[7] demonstrated psychic pupillary changes, and mapped the neuroanatomy of the retina. His botanical pursuits touched on a rust parasite of grains,[9,10] a false ergot,[17] and circulation in plants.[15] Fontana explored at length the pharmacology of viper venoms, curare from the Ticunas Indians, an American cherry-laurel poison, formic acid, poison ivy, and opium. In 1799 he reported contemporaneously with Cruikshank from the Hunterian Museum in London on nerve regeneration.[31,32,45] Prominent among early investigators of "dephlogisticated air" and "fixed air,"[46] he developed a gasometric apparatus,[13] manufactured water gas, decomposed water, adsorbed gases on charcoal, and devised an oxygen inhalator with lime-water for absorption of carbon dioxide.[46]

The scope of Fontana's experimental program was noted by M. Sage, editor of the treatise on poisons[45]: ". . . that which deserves the greatest consideration, is the very delicate analysis he has made of the most obscure and complicated enquiries; and the sagacity with which he has conceived experiments that could not avoid leading him to the truth. It is to be wished that he may serve in the future as a model to those philosophers who enquire into facts,

without prepossession or prejudice. How many disputes and opinions will then be terminated! How many truths will then be discovered! How many errors exploded! And how will the number of books be reduced!"

Fontana wore priestly garments of a church order but did not perform spiritual offices and was characterized by Garrison as a rugged personality, impatient at pretense or convention and embroiled frequently in distressing religious or political wrangles. His liberal sympathy with the French Republic led to Austrian hostility and his imprisonment in 1799. After Napoleon's conquest of Tuscany, he assembled a wax museum at Montpellier and in 1800 became first president of a new museum at Florence founded by the Accademia del Cimento. His experimental efforts continued to be rewarding in the later years which were less concerned with political controversy. Death from apoplexy occurred at seventy-five at Florence, and his remains were interred in the church of Santa Croce near those of Galileo and Viviani. Biographies were compiled by Bilancioni,[2] Burdin,[3] Cirincione,[4] and Di Renzi,[5] and summarized by Garrison[46] in the *Bulletin of the New York Academy of Medicine* in 1935.

Following the age of Scholasticism and a reawakening of human interests through the Italian Renaissance, Felice Fontana's proud "Century of Philosophy and Reason" was illumined and blessed with a sense of progress through the labor of a school of pioneer naturalists including, for example, Newton, Priestley, Lavoisier, and Réaumer. *A priori* logic and authority also remained popular, however, as instruments of the obscurantist; the pseudobiological mechanistic theory of Descartes which Fontana dismissed could still seriously be attacked or defended simply by deduction from generalities. While speculators debated thus their metaphysics, empirical observations were being assembled and evaluated by productive labors on a more prosaic plane after the manner of our curator of the Florentine museum. Fontana warned that "Great care should be taken not to confound what we imagine with what has been pointed out to us by observation." An acid critic of speculative biology, he remarked, for example, on pronouncements by Mead: "It is with regret that I see myself obliged to dwell on the errors of this writer, but his authority may easily mislead those who can only judge after others. How many are those who judge in this way! We may include in this number all those who are not capable of immediately consulting nature;

who prefer hypothesis to fact, and eloquence to truth; a severe and candid posterity will, without doubt, be astonished to find that there have been philosophers and naturalists in the eighteenth century who, even in the most important particulars, have ventured to substitute conjecture for experiment, notwithstanding that the latter would have been made with as much ease as it would have been decisive." After discrediting prior evidence on the efficacy of a "volatile alkali" as an antidote against viper poison. Fontana felt impelled to explain the reason for his break with authority: "I know of what weight the prejudice for a favorite hypothesis and the authority of a celebrated writer are. Error and truth seem to meet with the same difficulty and resistance from mankind; one in uprooting, the other in establishing, itself. The Newtonian system was combatted for a whole age before it was received, and it required a long time to abandon that of Descartes" . . . "I have made more than 6,000 experiments; I have had more than 6,000 animals bit; I have employed upwards of 3,000 vipers" . . . yet he adds "I may have been mistaken, and it is almost impossible that I have not been mistaken."

The system of Descartes was not, of course, universally abandoned among metaphysicists of Fontana's time. It was a dualism in the limbo between mechanism and vitalism and it now appears no more than a materialism on two interlocking planes, a theory proposing the living body as a sort of machine operated by a vital conscious principal articulated with the brain through the pineal gland. Descartes' dual view thus conveniently preserved the ancient concept of "vital or animal spirits" which Fontana attacked. A vital spirit called "nervous fluid" was supposed to flow between muscles and brain through passages in the nerves. Only a few years before Fontana's publication of the *Laws of Irritability*, the vitalistic doctrine was propounded anew in Claude-Nicolas LeCat's *Traité de l'existence, de la nature et des propriétés du fluide des nerfs, et principalement de son action dans le mouvement musculaire. Ouvrage couronné en 1753 par l'Academie de Berlin; suivi des dissertations sur la sensibilité des méninges, des tendons, etc., l'insensibilité du cerveau, la structure des nerfs, l'irritabilité hallérienne, etc.* (Berlin, 1765). Fontana appears to have been uninspired by such vitalism, and brusque or impatient at other pronouncements only sketchily supported by evidence:

The structure of nerves I have examined tends greatly to a doubt, even to those observations that appear the most constant and certain, and should at once inspire us with moderation and mistrust. A haughty and confident tone only becomes an ordinary observer, quite ignorant of the innumerable circumstances which may deceive him, and frequently the character of a visionary, who is more eloquent than judicious; of a learned man who loves rather to divine nature in his study than to consult her where she is; or rather of one who is fond of substituting dreams and visions for truths and matters of fact. A single experiment, one lonely observation, has often reduced to vapour whole libraries of such philosophical romances; and to the shame of our age be it said they are still multiplied, and persons are found who are fond of losing their time in reading them.

Incensed at overt pretense, Fontana nevertheless tolerated and recognized the fallibility of human judgment which enters even the most painstaking observation and interpretation. If an investigator has consulted nature herself, and

. . . has notwithstanding been mistaken, it can only be observed that error is more accessible than truth. Truth is simple, error is infinite; or rather, if truth expresses itself by unity, error is capable of expressing itself by infinity, or at least in so extensive a way as nearly to approach it. It is certain that in relation to us, error assumes all the appearances of truth, and may seduce us in a thousand ways. To be satisfied of this, it will be sufficient to read the history of human errors. The greatest philosophers have not been exempt from them, and the most enlightened nations have fallen into errors that have continued as long as themselves.

"The efforts then that man makes to come at the truth, are a kind of game of hazard, in which the probability of falling into error is very great, and that of attaining at a truth very small. Those who arrive the latest are least subject to err, since they profit by the errors of others, by finding the number of cases that lead to them diminished. Hence arises the impossibility of a work, complete and original in all its parts, being produced by one man, in a single age." He cited as an example:

After a century of observations made on the blood by so many good observers, from Leeuwenhoeck down to Father della Torre, we still seem ignorant of the figure, composition, size, and structure of the corpuscles that give a red color to this fluid; this will be seen in my *microscopical observations*, when I determine, imperfect as they are, to make them publick. It will now be sufficient to excite the attention of naturalists on these subjects, and to give a necessary impulse to the most skillful observers, to the end that they may bestow their industry on a subject so important to the understanding of the workings of the animal body. When I return to these matters, with a mind tranquillized and refreshed, I may add many important things, that may have escaped me the first time; and may correct others which I now think have been well observed. The true merit of a naturalist is in proportion to the number of discoveries he has made, and to the difficulty and importance of them. Man is liable to errors, and they should be

pardoned him. They must be considered, to adopt the language of the geometricians, as *quantitates evanescentes,* in comparison with the discoveries; when these last are many, useful, and original. *Dices enim* (says the great Haller) *cum fide autorem esse, cum quo naturam saepius consentire videbis.** But when these discoveries are not found in a book, error entirely discredits the work and its author. . . .[45]

Formulated after the model of Newton's principles in physics, the laws of Fontana on muscular irritability were an important but neglected contribution to the subject of muscular contractility. The first law concerned Haller's concept of contractility as a property of muscle fiber itself, and pointed out that a contraction follows only after some stimulus. The discussion displayed insight into the underlying nature of tetanic muscular contraction. The second principle was the refractory period discovered by Fontana in heart muscle and applied to better understanding of the function of other muscles. The original third principle was a disproof of the efficacy of a theoretical entity, the "animal spirits." It was a demonstration that the nervous system could *excite,* but not actually *cause* contraction of a muscle, and this proposition was illustrated by the classic spark and gunpowder analogy. Not actually a law, this principle was replaced by another in the later Italian version. The newer third law was a description of fatigue as a phenomenon occurring within the muscle fiber itself. In his fourth law, Fontana pointed out the loss of contractility which results from stretching or compressing a muscle, and certain medical applications of this principle. The fifth law was concerned with problems arising from atrophy of disuse. This chapter included a discussion of the behavior of muscles after a relatively brief rest and a progressive shortening related to the "treppe" effect observed on the kymograph record. A "History of the Refractory Period"[48] notes that Fontana's contribution anticipated subsequent investigations of the refractory period of the heart.

Irritability was a term introduced by an English anatomist and physician, Francis Glisson, in a paper on the stomach and intestines published in the last year of his life, 1677. Glisson defined irritability as a capacity for reaction to stimuli which characterized all the tissues of the body, including bone and the body fluids. The Swiss physiologist Albrecht von Haller (1708-1777) expanded Glisson's views into a doctrine of irritability in the sense of contractility of heart or other muscle fiber in response to a stimulus

* One can term reliable the author with whom nature is more often than not in agreement.

from nerves to skeletal muscles, or from other influences such as the venous blood entering the heart. Among those, however, who objected to this mechanistic explanation of the heart beat was the Scottish physiologist, Robert Whytt (1714-1766), who demonstrated that the heart relaxed in diastole despite continued presence of blood in the ventricles. Fontana incorporated in his account of the refractory period Whytt's evidence that a heart continues to relax and contract in the presence of a continuous stimulus, but rejected an explanation of this rhythmicity in terms of a sentient principle or "Archeus" which sought to relieve itself of discomfort.

In his *Laws of Irritability*, Fontana referred to muscular contraction as Hallerian irritability; he explained cessation of a contraction as exhaustion of this irritability, and relaxation as resulting from the elasticity of the contracted muscle. The time required for recovery of such irritability varied with the age and size of the animal and accounted for differences in the heart rate. A sufficiently powerful stimulus to the relaxing heart could bring about a contraction when an ordinary stimulus failed to do so. He extended this principle to an explanation of sustained contraction of skeletal muscle and the fine tremor which can be felt during such contraction. These numerous small, rapid contractions and relaxations were compared with beats of the heart, although they maintain a steady tension of the muscle as a whole. Following Fontana's formulation of the principle of temporarily diminished irritability, the idea of a refractory period was taken up by a German, Christophe Girtanner (1760-1800), in a paper omitting mention of Fontana but closely parallel to his description: a *Memoir on irritability considered as the vital principle in organic life*, first published in French in Rozier's *Journal de Physique* and later translated into English and German. Girtanner placed more emphasis than Fontana on a gradual restoration of irritability and a relative refractory period. He also pointed out a new characteristic of irritability now known as *adaptation*, an idea probably taken from Brown. Girtanner popularized the chemical theory of exhaustion and restitution which Fontana had developed. He inspired monographs such as that of Brandis, who proposed ligation of the coronary arteries to demonstrate their rôle in restoring exhausted irritability to the heart. Brandis extended Fontana's laws of muscular irritability to other organs, to anabolic and catabolic functions, and to glandular function. Another writer on

irritability, Christoph Pfaff, discussed temporary exhaustion as a fundamental characteristic of all life. Schaeffer added the proposal that nerves in the heart mediate the stimulus from the blood to the muscle fibers and that the observed exhaustion and restitution occurred in these rather than in the muscle fibers themselves.

Theories of animal electricity also found application to the problem of the heart beat and muscular contraction. Luigi Galvani (1737-1798) had proposed that muscle might function as a Leyden jar, positive on the outside and negative within. Eusebius Valli (1762-1816) took up Galvani's idea; he held that the electrical charging and recharging of a muscle differed from electricity outside the animal in requiring a definite interval of time for restoration after passage of the electrical fluid from within the muscle to the brain; this interval was the refractory period. He believed that nerves propelled electricity from muscle to brain by a pumping action.

In Germany the doctrine of exhaustion and recovery was advocated by Girtanner but attacked by adherents of the phlogiston doctrine. Johann Metzger (1739-1805) objected to emphasis on oxygen as maintaining irritability. Niemeyer believed that the reported changes in irritability were actually only changes in the strength of the stimulus. Johannes Müller (1801-1858) in his textbook of physiology rejected Haller's theory that irritability was a property of muscle independent of the nerves. Without reference to source he also rejected Fontana's view that the heart beat was a result of repeated loss of responsiveness to a constant stimulus, since other muscles were capable of sustained contraction if the stimulus continued. He made no reference to Fontana's explanation of sustained contraction. Moritz Schiff (1823-1896) reproduced Fontana's argument in detail, confirming the observation that diastole of the heart continued to completion uninterrupted by various stimuli. He pointed out even more clearly than did Fontana the presence of an absolute refractory period followed by a period of responsiveness only to very strong stimuli. The neurogenic doctrine of the cause of muscular contraction had been increasing in favor and Schiff, unlike Fontana, came to believe that cardiac nerves were the cause of the heart beat, and that repeated exhaustion of irritability occurred in the cardiac nerves rather than in the heart itself. Schiff applied high frequency stimuli to the cardiac and skeletal nerves to obtain a rhythmic response in the muscle and a block now known as Wedensky inhibition. Sub-

sequent findings cast doubt on Schiff's belief that the vagus was the motor nerve to the heart; Eduard Pflüger (1824-1905) blocked the vagus by electrotonus without stopping the heart. Schiff's theory that exhaustion occurred in the nerves was also shown to be in error. Because of the general disrepute which then befell the term exhaustion, Fontana's explanation of the periodicity of the heart remained unknown to the majority of physiologists.

The next advance in the study of the refractory period accompanied the advent of graphic recording. From Carl Ludwig's laboratory in the Institute of Physiology at Leipzig there appeared in 1871 a paper by H. P. Bowditch with the first account of "treppe," a stepwise increase in contraction, and a formulation of the "all or nothing law." Bowditch, in the course of experiments on the stimulus threshold of the heart, was unable to obtain a response regularly with minimal stimuli. Later Kronecker and Stirling explained this difficulty by variations in the stimuli. They were able to demonstrate graphically that a series of equal stimuli would produce an effect, or no effect, depending on their strength. The refractory period was prolonged by low temperature; hence the heart beat became slower, as Fontana had observed when he immersed hearts in cold water.

The French physiologist, Etienne Marey (1830-1904), has properly received much of the credit for the discovery of the refractory period. He introduced the term, was the first to show graphically the changes in the threshold to stimulation throughout the cardiac cycle, and to perceive that the heart was completely inexcitable during the first moments of systole. It was only after its exact formulation by Marey that the doctrine of the refractory period became widely known and accepted. The term *absolute* seems to have been applied to the first part of the refractory period in 1906 by A. J. Carlson. Schultz, later in the same year, referred to an *absolute* and a *variable refractory period*. Soon afterwards the term *relative refractory period* appeared in a paper by Carlson. A *supernormal period* in the heart was discovered by Adrian in 1920, although a passage in Schiff's papers indicates that Lelaunié had also observed it.

The papers of Bowditch, Kronecker, Stirling, and Marey do not indicate how much they knew of precise earlier accounts by Fontana and his followers, particularly Schiff. They probably were acquainted only with a general concept of alterations of irritability as applied to physiological processes. Theories of the cause of the

heart beat had deviated from the concept of Hallerian irritability toward a neurogenic doctrine. At the same time the actual concept of irritability was extended to a variety of other phenomena in which the laws of its original application to the heart were lost from sight. The general principle of physiological exhaustion as a basis of periodic processes was certainly well known, as shown in the section on irritability in Virchow's pathology and in Reil's physiology text. Burdach, Erasmus Darwin, and John Brown referred specifically to Fontana's experiments. A final question is the extent that the discovery of the refractory period by Fontana may have been inspired by even earlier work. Recurrent exhaustion and restitution as a part of vital processes was discussed as fatigue and sleep by Haller's teacher, Boerhaave, who proposed that the heart also sleeps, its sleep being divided into instants between its successive beats. There is no evidence, however, that the actual discovery and experimental demonstration of the refractory period was not Fontana's own contribution. Gesner, in 1767, wrote of him: *"Fontana leges irritabilitatis constituit, ingeniousus homo et accuratus."**

* Fontana's ingenuity and precision have defined the laws of irritability.

The Royal Faculty of Physicians and Surgeons*

A. L. GOODALL**

IN reviewing the history of any Glasgow institution of great age, one must bear in mind the changing character of the city. It was in the sixteenth century a small country town, depending on its ecclesiastical and university connections for any importance which it possessed, and at the beginning of our story it had only some seven thousand inhabitants. It was a very pleasant city with a cultured population and a delightful appearance, if we may judge from contemporary accounts. Samuel Pepys in 1682 entitled it "a very extraordinary town for beauty and trade much superior to anything to be seen in Scotland."

In medical matters it must have been somewhat backward, and no doubt it had the same piles of filth in the main streets which characterised other mediaeval towns. Certainly it was periodically visited by those diseases associated with poor public sanitation, and on one occasion in 1646 the University moved to Irvine to escape the ravages of the plague.

The records of the University note one Andrew de Garleis, a physician who was admitted to the University in 1469, but no further trace of him is found. He was a Stewart of Garlieston in Wigtownshire and probably was a cleric who took his M.D. as part of his general cultural education. Andrew Boorde, the English spy who reported on Scottish families to Thomas Cromwell and on whose word little reliance can be placed, wrote of studying medicine in Glasgow in 1536 but there is no further evidence of a medical school at that time.

The scandal of Glasgow medical practice had aroused the Town Council several times. An occasional surgeon was paid grants by the town to induce him to practise in the city without much success. In 1598 the Kirk Session raised its voice, and in 1599 the Town Council set up a committee consisting of three baillies, three clergymen, the principal and a regent of the University, and the master of the grammar school, and "utheris cunyng men of that arte" to investigate the status of practitioners. In 1599, 355 years ago, the Royal Faculty was founded.

* Based on the Finlayson Memorial Lecture delivered to the Royal Faculty of Physicians and Surgeons.

** Glasgow, Scotland.

In considering these dates, one must look for a figure who stimulated this activity. He is easily found—Maister Peter Lowe. To him we owe the early regulation of the Glasgow medical profession and the foundation of a tradition of medical service to which we still subscribe.

The date of his birth is unknown but was probably about 1550, as he gives in the preface to the second edition of the *Whole Art* the details of his thirty years abroad until 1596. He would probably have been about fifteen when he first went abroad to study. The place of his birth is also unknown. The first possibility is Glasgow. Lowe was a well-known surgeon before he settled in the city and he must have had some reason for going there. He had a brother and possibly a sister in Glasgow. The Glasgow records contain no reference to his parents and the Commissariot of Glasgow has no will of his father or mother. There is no baptismal register going so far back. Matthias refers to him as "Glascuensis" and Douglas goes further, quoting him as "Glasguae in Scotia natus." The first edition of the *Presages* is dedicated to Robert, Lord Sempill, Sheriff of Renfrew. These points in favour of a Glasgow birthplace are far from convincing, but his birth took place about the same time as the institution of our record system. While these records are reasonably well preserved, there are gaps which make the formation of firm conclusions impossible.

The second possibility is Errol. This suggestion is based on the appellation which he suffixes to his name in all his first editions, Arellian. In a rather curious little book by Christian Irvine published in 1682, the author attempted to elucidate the dog-latin appellations which were wont to be applied to people's names. Under "Arellius" he listed the Earl of Errol. On this fact and on the usual practice of authors of the time of indicating the place of their birth, it has been suggested that Lowe was born there. He was certainly a Scotsman, as he claimed at the heading of each section of his books.

If we remember the background, it is unlikely that Lowe in 1596 would have claimed any connection with the Earl of Errol. That nobleman, who was a Roman Catholic, had been involved in a plot with Spain and Rome to oust James VI in 1589. Errol and Huntly defeated Argyle, the King's man, in 1594 but in 1595 the King himself with Argyle turned the tables. The Catholic lords fled abroad and although they were allowed to return to Scotland in 1596, it is unlikely that a man in the King's circle would like to

stress his association, even though we admit that James's policies were serpentine. The Duke of Lennox, the virtual ruler of Glasgow, was a sworn enemy of Errol and a friend of Lowe, taking him on an embassy to France in 1601.

In the Calendar of Scottish Papers for the years 1588-95, there are certain letters preserved which throw a new and unexpected light on Lowe. It seems that a certain Alexander Dickson was secretary to the Earl of Errol and was acting as a spy on behalf of the Catholic League. This man's servant was Peter Lowe. Further, complaint is made by the English ambassador at Berwick about one Peter Lowe, "a Scotchman and a pirate," who had captured an English ship at Burntisland and taken it to Montrose where the ambassador was unable to secure satisfaction. This "pirate" was really a privateer acting under the protection of the Lord High Admiral of Scotland. It may be significant that Montrose is not far distant from Errol. Lowe certainly attended Archbishop Beaton after he had fled to France. All these facts suggest that Lowe was a Roman Catholic, yet he appeared in Protestant London in 1596. He also married a daughter of the Protestant minister of Glasgow Cathedral.

I have investigated the records at Errol with little success. It is a very ancient township and had at one time great ecclesiastical importance. There was a Celtic church there, and a record of ministers is kept from the earliest times. The first Protestant minister was Alex. Allardyce who took office in 1567 so that if Lowe had been born there in 1550, he was a Roman Catholic. Incidentally, the church of Errol provided two principals to Glasgow University, John Strang (1614-26) and the great John Caird (1849-57). The session records at Errol do not go further back than 1660, and Finlayson notes that records of births began in 1553. The Register of Sasines for Errol begins only in 1617.

The third possibility is Ayr. In his great work on venereal disease, Astruc had some cutting remarks to make on our founder. He sneeringly suggested that he came from some remote Scottish village and mentioned Ayr. This is most improbable and there is no further evidence.

The fourth possibility is Airlie. Professor Fordyce has been kind enough to spend some time on the possible meanings of Arellian. He put forward this suggestion but I have no further evidence. I feel myself that Lowe was a Glasgow, or at least a West

of Scotland, man and we shall consider another meaning for "Arellian" presently.

Peter Lowe must have gone abroad at an early age. This was the usual custom for Scottish students, and many continental universities had Scottish nations in their midst. France passed a law naturalising Scots in 1599 and the Law School of Orléans had a strong Scottish party. Lowe's place of education is not known but he must have been a *magister artium,* for he rarely omits the Mr. before his name, even using it in his signature.

It has been suggested by Duncan that he was a graduate of Orléans, and Finlayson received a letter in 1877 from Dr. Dureau, Librarian of the Paris Academy of Medicine, in which he stated that he had seen Lowe's name on some registers of that ancient university. This seems conclusive but in trying to follow it up, I find that all the records of Orléans were destroyed in the air raids of 1940. Further, the archivist of Loiret thinks it is unlikely that Lowe was educated there. Professor Fordyce thinks it improbable that a man of Lowe's ability would misspell the name of his alma mater, the graduate of Orléans being "Aurelianus." It is also doubtful whether Orléans taught medicine at that time. The University of Orléans had ceased to exist some time before the sixteenth century, but there was a school of law. There also seems to have been a Royal College of Medicine but this would not grant an M.A. In any case, Lowe's medical education was completed by his becoming a master of the College of St. Côme, the hallmark of the gown surgeon. I have spent some time in Paris searching for traces of Lowe without success. There are large gaps in the records of Royal Surgeons, members of Colleges and Faculties, and State documents which detract from the value of negative evidence.

Lowe's military career in France and Flanders occurred at a most stirring time both in military and medical aspects. Ambroise Paré (1510-96) was at the height of his career, and Lowe may have served with him. It seems that he changed sides and religions at least once for we find him with the Spanish regiments at Paris in 1588-90, the Catholic side, and thereafter with Henri IV. It must, however, be remembered that Henri became a Catholic in 1593, cynically remarking that Paris was worth a mass. The list of Henri's surgeons is incomplete and only that of 1593 is extant. In the Calendar of Scottish Papers (1595) is a note that Pete Lowe was "newly admittit" surgeon to Henri IV.

In 1596, Lowe appeared in London and published his first book, *An Easie, Certaine, and Perfect Method to Cure and Preuent the Spanish Sicknes.* It is perhaps not purely coincidental that Henri IV sent an embassy to Elizabeth in that year.

In 1597, Lowe's great work, *The Whole Covrse of Chirurgerie,* appeared. This is one of the first works to be written in the vernacular and has appended a translation of the prognostics of Hippocrates, probably taken from the French. While writing in English, Lowe understood and wrote elegant Latin in his preface. He apparently used the more widely understood tongue in order that his work would reach the largest audience.

Lowe appeared in Glasgow in 1598 when he was appointed town surgeon. He also fell foul of the Kirk and was sentenced to stand on the pillar—a kind of cutty stool. He apparently took this sentence lightly, for the record states that he had not carried out his penitence nor satisfied the thesaurer. The nature of his peccadillo is not recorded but it may have been trivial; for example, people were sentenced to this punishment for lying in the Kirk yard at time of sermon and for speaking ill of the dead. On the other hand, a Dr. Ross was thus punished for his third offence of fornication and the sentence was commuted on payment of 100 merks. One finds that penalties were often related to social position rather than to the gravity of the offence.

In the year 1598 the Kirk Session was pressing the Town Council for an enquiry into the state of medical practice in Glasgow and a committee was set up. This consisted mainly of clergymen but they were to be assisted by "utheris cunyng men of that arte." They do not seem to have reported, probably because the Faculty was founded by charter from King James VI.

One can only conjecture on Lowe's relationship to the Crown but he is described in the Charter as "our Chirurgiane and chief chirurgiane to oure dearest son the Prince." The Prince was Prince Henry, at that time five years old, who died in 1612 and whose wisdom, had he lived, might have prevented Civil War. James VI had wide interests and a considerable knowledge of medicine, as may be seen by reading his *Counterblast to Tobacco,* an erudite description of the evils of smoking. It seems likely that Lowe had considerable influence and probably approached the King directly about the conditions of medical practice in his own town. In any case, a letter under the Privy Seal was granted to him on 29 November 1599 founding a body of medical men which

became eventually the Royal Faculty of Physicians and Surgeons of Glasgow.

Lowe had this charter recognised by the Town Council in 1600 and then proceeded *en embassage* to France with the Duke of Lennox in 1601. This embassy had no definite purpose, being in the nature of a courtesy visit, but it included John Spottiswood, Archbishop of Glasgow, who before departure "made no scruple to go in to see a masse celebrated." In 1602 the first meeting of the new body was held. Five members met along with Lowe and Hamilton, and these, with two added shortly afterwards, probably completed the complement of Glasgow practitioners of the day.

Lowe was married first to Grisell Pollart who may have been a Flemish woman or from the family of that name in Cathlaw in Linlithgow. We have only one reference to her in 1599. She must have died shortly thereafter, for he married Helen Weymss, daughter of the first Protestant minister of the Cathedral about 1604. By his first wife, Lowe had at least one son, John (who is entered on the burgess roll of the city as "eld. l. son." and as "only son" in a decreet Weymss v. Lowe in 1623) and a daughter, Christianne, by his second. I have discovered a legal action in which Christianne sued John in 1623 for failure to carry out the terms of the marriage contract between Peter and Helen (dated 10 February 1604). Lowe appears in the Town Council "Minutes" of 1608-1610 and in the Privy Council Records for 1609, when he gave a medical certificate to Archd. Finlay.

Peter Lowe died on 15 August 1610. This date is quite certain, for it appears in the copy of his will preserved in the Commissariot of Glasgow. I find that for some unknown reason the will is entered twice and in each copy this date is given. Incidentally, he left to Janet Taylor "for 20 gallons of ale £10. 13. 4." and to Marion Walker "for fetchit wynes at sindry times £6." We have then to explain why the date on the tombstone is 1612. This stone must have been erected some time after his death, for the names of his son and grandson appear on it; the date may not indicate the date of death.

We have also to explain why the preface to his second edition is written "from my house in Glasgow, the 20 day of December. in the yeere of our Lord God, 1612." There is a clue here in that this edition is much enlarged and has illustrations. The illustrations are copied from Paré and Guillemeau almost directly and are not referred to in the text. It seems likely that the smart printer

thought to make the edition seem to come straight from the author's pen and altered the date. On the other hand, the story of the granting of the Charter as related in the preface takes place fourteen years before.

The date given in the records of the College of St. Côme (1617) for the death of Petrus Louvet is obviously wrong, as Helen Weymss was married again to Walter Stirling and their son was born in 1615. It seems to me likely that "Petrus Louvet, Scotus" was not Peter Lowe.

The fascination of tracing Lowe's historical remnants has kept me for long on his story. He seems to have had many facets, and much of the difficulty in finding facts of his career is no doubt due to political and religious intrigue. Yet here was a man who wrote a major surgical work, who had the foresight to obtain a charter whose terms are lauded to this day, and who is remembered four hundred years later with affection. "Si memoriam requiris, circumspice."

The co-founder of the Faculty, Robert Hamilton of Craigthorne, has left even fewer traces of himself in history. He was related to the Hamiltons of Burmelton and is noted in 1587 as being a servant of the Commendator of Pluscardine. He is described in the Charter as "professoure of medicine," in his will as "doctor of physic," and in the Privy Council records of 1628 as "doctor of medicine." There is, however, no record of his M.D. and probably these terms only implied that he was a practising physician. He is described as Mr. which suggests that he was a *magister artium;* two graduates of Glasgow University bore that name, one in 1584 (possibly Robert Hamilton of Haggs) and one in 1591. Hamilton must have attained some eminence, for, along with Peter Lowe and some others, he acted as an arbiter in the famous case of the Merchants *vs.* the Trades which resulted in the setting up of the Trades House in 1605. In 1628, it is recorded in the Privy Council records that he gave a medical certificate to the Countess of Abercorne and he is described as doctor of medicine.

Hamilton served as the major office bearer of the Faculty in the first twenty years of its existence. He was visitor in 1602-1610 except 1606 and again in 1620-21. In the intervening years he was a boxmaster. He signed a grant of a hospital at South Green of Glasgow and undertook subscriptions to it in 1617. He died in October, 1629 and I have found his will in the Register House. This shows that he was no better off than some of our modern

Fellows. He left "na guidis nor geir pertening to him except the insycht of the house": in toto, 84 pounds Scots (£7 sterling). This is a curious fact, for the year before (1628) he had been left lands in Ireland by his kinsman, Sir Claude Hamilton of Shawfield.

Robert Hamilton had two sons, John and James. John gained a bursary to the Glasgow College in 1623 and James became a physician and Visitor of the Faculty on five occasions.

I have drawn these two characters fairly fully, for to them was granted the Charter and to "their successouris, indwellers of our citie of Glasgow."

The Charter is a very interesting document for it shows extraordinary foresight on the part of its authors. It starts by noting "the grit abuisis quhilk hes bene comitted in time bigane, and zit daylie continuis be ignorant, unskillit and unlernit personis, quha, under the collour of Chirurgeanis, abuisis the people to their plesure, passing away but tryel or punishment, and thairby destroysis infinite number of oure subjectis." It had jurisdiction in Glasgow, Renfrew, Dumbarton, Renfrewshire, Clydesdale, Lanark, Kyle, Carrick, Ayr, and Cunningham, an area closely corresponding to that of the modern Western Regional Hospital Board. It will be noted that a Glasgow institution was given jurisdiction over older and more important communities.

It goes on to give Lowe, Hamilton, and their successors power to examine and license all those practising surgery who were found properly trained and of good character. Each candidate for membership had to produce "testimonial of the minister and eldris or magistratis of the parochin quhair they dwell."

Secondly, it put the duty on the visitor to visit "everie hurt, murtherit, poisonit, or onie other persoun tane awa extraordinarly and to report to the Magistrate of the fact as it is."

Thirdly, it allowed the visitors with the advice of their brethren to "mak statutis for the comoun weill of our subjectis anent the saidis artis."

Fourthly, it dealt with the position of the physicians, requiring them to produce "ane testimonial of ane famous universitie quhair medecine be taught." (This suggests that the Faculty had only an inspecting rôle in the licensing of physicians, but as early as 1612 Robert Archibald was examined and licensed to practise both medicine and surgery.)

Fifthly, no person was to sell drugs in the area unless he had been inspected by the visitors and by William Spang. (This latter

man must have been of some age for he had been in practice as an apothecary as early as 1574. He was visitor in 1606.)

Sixthly, no dangerous drugs, "retoun poison, asenick or sublemate," were to be sold except by apothecaries who had to take caution for "coist, skaith and damage."

Seventhly, the Faculty must convene on the first Monday of each month "at sum convenient place, to visite and give counsell to pure disaisit folkis gratis." The Faculty still meets on the first Monday of each month and the minutes invariably end with the phrase, "The poor were visited gratis and the Faculty adjourned."

In return for all these commitments, the brethren were excused from certain civic duties such as serving on juries except as expert witnesses, paying certain taxes, and military duties.

This is an extraordinarily enlightened document for its period. It covers the function of a modern medical corporation to an amazing extent. The duties may be divided into two types: those for the protection of the public such as the proper examination of intending practitioners, the inspection of drugs, the medico-legal duties; and those for the regulation of the profession. The Faculty appears as the first medical charity of Glasgow, for the prior "hospitals" were really almshouses. It has been a common mistake of historians to suggest that modern improvements were envisaged long ago, and for such a suggestion regarding the Faculty I hold no brief. Nevertheless, I can imagine that this set of regulations, if interpreted in the spirit in which it was conceived, could lead to a system which would be of great benefit in an area which was almost autonomous. It was only when developments in other bodies and in other parts of the country took place that difficulty arose in the application of a régime which was in itself excellent.

In 1602 the apprentices were to be examined at the end of their third, fifth, and seventh years and the examinations were no easy ones. In 1612 the visitor had to lecture on "Medicine, Chirurgeri or Apothecarie, the nature of herbs, droges and such lyk." Written examinations and clinical instructions were instituted in 1671. A special library for apprentices was set up in 1762. Thus the Faculty became the first teaching and examining body in the West of Scotland. Unlike other medical corporations and even some of the universities, the Faculty examined entrants to its membership for 328 of the 355 years of its existence.

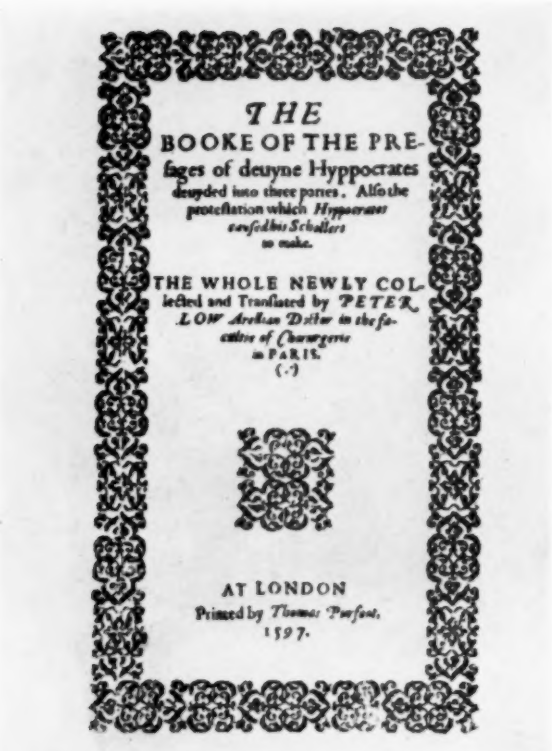
The seventeenth century was a time of trial to the Faculty. They were struggling to set up a worthy institution and a code of

ethics while the quack and charlatan still carried on their nefarious trade. These persons were rigorously prosecuted at the cost of much time, trouble, and no little treasure, but many proved contumax and had to be dealt with in the courts and even in the Court of Session. General Signet letters were issued by King Charles I in 1635 which made possible the outlawing of persons who practised surgery against the terms of the Charter and the confiscation of their goods. Apart from these external matters, there were internal squabbles to resolve. The main ethical faults of the members seem to have been the stealing of each other's patients, the reviling of the office-bearers, and the breaking of the Sabbath. At the first meeting it was agreed that no member would attend another's patient without his and the patient's consent. Later, no member was to interfere with another's patient at all unless a complaint was made and the Faculty decided that it had to be investigated.

The most important happenings of the century relate to the barbers and to the physicians. The barbers in Glasgow claim an early origin but it is unlikely that they had corporate existence before 1656, as we shall see. Many trades were represented in the Town Council although not legally constituted. An Incorporation was set up by the purchase from the Town Council of a Letter of Deaconry or Seal of Cause. This was operative only in the town and was quite unlike a Royal Charter. The barbers had probably, as in other centres, been in the habit of bleeding, treating minor wounds, and undertaking other simple surgical procedures. Lowe had a very poor opinion of them as surgeons and makes many derogatory remarks in his works. I might quote the following as typical: "These faults [pretending to be able to cure all diseases] be often comitted of some who, usurping the name of Chirurgion, being unworthy thereof, have scarce the skill to cut a bearde which properly pertaineth to their trade." It is not surprising therefore that barbers do not appear in the original charter.

At a meeting in 1602, however, the barbers were adopted as a pendicle of surgery. They had only very few rights and were not to interfere with real surgeons' work, "to medill not with anything farder belonging to Chirurgerie." As Duncan says, they were adopted as servants and not as sons. This uneasy surveillance of barbers by the Faculty continued until 1656. In that year the surgeons along with the barbers sought a Seal of Cause from the Town Council. The object of this was probably to allow the sur-

MAISTER PETER LOWE
From the portrait in the Royal Faculty of Physicians and Surgeons.



THE
BOOKE OF THE PRE-
sages of deuyne Hyppocrates
deuyded into three parties. Also the
protestation which *Hyppocrates*
exacted his Schollers
to make.

THE WHOLE NEWLY COL-
lected and Translated by *PETER*
LOW Archian Doctor in the fa-
culties of Chirurgerie
in PARIS.
(.)

AT LONDON
Printed by *Thomas Purfoot*,
1597.

The title-page of the first edition of the "Presages" 1597.

Peter Lowe's tomb in the churchyard of Glasgow Cathedral.

geons to have a share in the running of the town. The Town Council had great powers over its citizens and especially over its craftsmen, and, although the deacon of the surgeons, e.g. Andro Mylne in 1637, had occasionally taken part in the business of the town, there was no regular representation.

The physician members of the Faculty were not involved in this local document at all and there is a specific note in the minutes that the Seal of Cause was to be drawn up "without prejudice of the old gift grantit to them be the decest King James." In actual fact, two bodies now appear: the Faculty of Physicians and Surgeons under the Royal Charter with jurisdiction over a wide area, and the Incorporation of Surgeons and Barbers under the Seal of Cause with jurisdiction only in the town.

The barbers were a constant source of trouble to the Faculty. Only twenty years after they joined the surgeons (1676) we find their conduct condemned by the Faculty in the following wonderful piece of invective.

> The sd day, upon informaone given to the facultie that severall barbors, who are members yrof within the burgh, are prophaners of the Sabath by barborizing of persons yt day, They taking it to ther consideraone, and finding the same to be so gross a sin, and violaone and breach of the Sabath day, contrair to the word of God, and to all lawes both humane and divyne, That any sould tak upon them who are members of the Incorporaone, and does sitt and vott wt them to comitt the same, being in itself most scandelous as it is a hiely provoking sin, They all wt on consent doe heirby enact that qtever person, ether at pnt incorporat wt them, or who sall heireft be admitted as a member of the facultie, sall presume to barborize any person qtsever upon ane Sabboth day, and he be convict yrof in presence of the facultie, sall for each of the first and second faultes, pay in to the Collector of the upsett ffourtie punds Scots, and upon refusal to pay the same, to be declarit no member of the facultie, and his act of admissione cancellit and delet. Lykeas if any sall happen to be so gross as to be convict a third tyme of the foresd sin, they do heirby declare him no member of ye sd facultie fra yt tyme furth as if he had never been admittit, and incapable at eny tyme yreft to be readmittit, and his act of admission cancellit, scorit, and expungit furth of ther records as a prson unworthie of being incorporat in any societie, and much less to be a member of the facultie.

This association continued until 1719 when the barbers began to assume rights to which they were not entitled, and that year the Surgeons applied for release from their seal of cause. Actually the surgeons and barbers did not meet together after 1719, and in 1722 the Town Council granted the disjunction.

In 1657, Cromwell had proposed a College of Physicians in Edinburgh. Two members of the Faculty were sent through to oppose this because the Physicians were to have jurisdiction over

the surgeons. The Physicians of the Faculty were invited to enter the new corporation but unanimously decided to adhere to their old gift. The Town Council sent for the visitor to assure them that there was no possibility of the Faculty giving up its old rights. In face of this, no College was set up until 1681.

The physicians in relation to the Faculty were in an uncertain position. A few had been members from the earliest times but apparently the agreement with the barbers had scared them off. In 1672 the Faculty approached Dr. John Colquhoun, enjoining him to become a member for the better carrying on of the provisions of the Charter. He agreed under certain conditions, upholding the status of the physician. For instance, he would have nothing to do with the barbers and insisted that the physician visitor would take precedence over the surgeon visitor. The physicians had a power of veto in any decision which appeared to affect their honour. By 1674 the physician visitor was called the *praeses* and the surgeon visitor merely the visitor and until 1820 only physicians were presidents of the Faculty.

Colquhoun nominated Dr. Thomas Hamilton of Glasgow and Dr. Michael Wallace of Ayr to be members with him and a year later Bryce Bell of Kilmarnock joined them. This wide geographical representation suggests that the Faculty had in mind the more strict enforcement of their Charter over its original area. From this time on, physicians as well as surgeons were expected to join the Faculty and most did so.

In 1672, the Scottish Parliament passed an Act ratifying the charter of King James VI. This act is a curious document. It sets out briefly the original charter and then proceeds to extend it in favour of surgeons, apothecaries, and barbers. It is doubtful if this extension was legal and in any case the barbers left the corporation forty-seven years later.

In 1679 the Faculty passed a law whereby only members' sons or sons-in-law or members' apprentices should be admitted to the Faculty and therefore to practise in Glasgow. Magnanimously, they would allow the Town Council, if there was a shortage of practitioners, to invite applications from other persons who would be examined and if found suitable, admitted. This aroused the Town Council who had a duty to ensure that there were sufficient tradesmen of good repute in the various trades. They asked the Faculty to license Henry Marshall from Kilsyth. The Faculty refused. The Town Council themselves then gave Marshall per-

mission to practise. The fat was now in the fire for, if a non-professional body were able to give such permission, the Faculty's rights were over. The case was taken to the Court of Session and the Faculty won. Presumably to show that they had nothing against Marshall and that they were acting on principle, they proceeded to examine and license Marshall who became visitor in 1704. Thus began the notable medical dynasty of Glasgow, so lately and lamentably ended by the death of John Marshall Cowan. This quarrel with the civic authorities resulted in an absence of representation in the Trades House and Town Council from 1679 to 1709.

In 1697 an important event occurred. The Faculty acquired its first local habitation. Previous to this time they had met in many places, especially in the Craft's Hospital, Hutcheson's Hospital, and members' private houses. Now they acquired a site in the Trongate immediately to the west of the Tron steeple and erected a building which existed as lately as 1858. As a consequence of this, they began to acquire a library, and there is a book giving the names of the original donors of books in 1698. Direct reference to the minutes of this time is impossible as the minute book for 1688-1733 was destroyed in a fire in the Clerk's house in the latter year.

In 1733 the Town's Hospital was erected through the efforts of many public bodies. It was really in the nature of an almshouse but there was an infirmary attached. To this the Faculty gave generously of their money and of their skill, the physicians taking year-about to advise the inmates and the surgeons, six months. They also provided the medicines gratis.

In 1740 a further supervisory duty was undertaken by the Faculty when they examined and licensed midwives. These women were up till then mainly uneducated persons with no claim to exercise their trade apart from their own large families. While the details of the Faculty examinations are not extant, it certainly improved the standard of domiciliary midwifery and began the recognition of nursing and midwifery as professional occupations. It is interesting to note that Sir David McVail suggested that the Faculty should institute a diploma in nursing in 1884, only shortly after Florence Nightingale had drawn the public attention to the need for better educated women for this duty.

It is said that there was no great Scottish family about this time which had not a guid-ganging law-plea. If this was a mark of re-

spectability, then the Faculty was a most distinguished body. The details of one of these may be given shortly for it is well documented and typical of such cases. In 1759 a man called Calder began to sell secret remedies and to treat patients. He was a gardener by trade and did not claim any medical training. When he was summoned before the Faculty for examination, he at first refused to appear but on threat of being brought by the authorities, he appeared but refused to submit to examination as he maintained that the Faculty was not the legal successor of Peter Lowe and Robert Hamilton. He was found grossly ignorant but continued to practise. The Faculty attempted to force him to pay his fine but he raised an act of suspension which dragged on from Court to Court until the Faculty won the case in 1763.

In the middle of the century, an event of great importance to Glasgow medicine occurred. William Cullen began to teach medicine, chemistry, materia medica, and botany. He was born in Hamilton in 1710 and apprenticed to a member of the Faculty, John Paisley, in 1725. He returned to Hamilton to practise in 1736 and applied for examination. No record exists of this examination and he entered as a physician in 1744 in virtue of his M.D. obtained at Glasgow in 1740. In 1740 he handed over his surgical work to the great William Hunter and later to Thomas Hamilton and in 1744 began to teach, at first outside, and later inside the University. He became professor of medicine in 1751. He was president of the Faculty in 1747-49.

When Cullen proceeded to Edinburgh in 1755, he had an assistant, Joseph Black, who was a brilliant chemist. He became professor of anatomy in 1756 and one year later professor of medicine. In 1766, he followed Cullen, of whose college he was a graduate, to Edinburgh. He was President of the Faculty in 1759-60.

These two men were the real founders of the Glasgow school of medicine and established the teaching tradition of the city. They were brilliant in their own fields and shed great lustre on the rising school. Great though the Glasgow school has been, who can tell what heights it might have attained if William Hunter's suggestion of 1765 had been fulfilled? In that year Hunter wrote to Cullen suggesting that, with Black, they should set up a school of physic in Glasgow. He wrote, "We should at once draw all the English, and I presume most of the Scotch students." This trio would probably have made Glasgow the greatest medical centre of the world but unfortunately both Cullen and Black proceeded to

Edinburgh to establish the reputation of that school. William Hunter was enrolled as an Honorary Fellow in 1751.

It became obvious in the latter half of the century that many practitioners, especially those in the country districts, were avoiding joining the Faculty because of the large entry monies and the small return they obtained therefor. To encourage such to enter, the Faculty established a licence in 1757 which allowed practice but no say in the running of the corporation. This was not popular, but on its reinstitution in 1785 many men entered by passing the examination and became accredited practitioners but without right in the Faculty or its property. In 1811 the licence was extended to town practitioners. In 1858, with the passing of the Medical Act, the Faculty was recognised as a licensing body with a seat on the G.M.C. and granted its licence in conjunction with the Royal College of Physicians of Edinburgh. In 1883 the modern triple qualification was founded, a licence of the three Scottish medical corporations.

In 1791 an ingenious attempt was made to overcome the difficulties caused by rising taxation. This might be of interest to the present office bearers who have a much greater stimulus than had our predecessors. The Charter absolves the Faculty from "stenting taxationis" and the Faculty claimed exemption from certain taxes and the quartering of soldiers, a grievous burden of the day. The tax commissioners were adamant, but some improvements were obtained in the billeting laws.

Again in 1791 the brethren found that their historic building was now too far east and not large enough for their purposes. They therefore planned and built the second Faculty Hall which stood on the east side of St. Enoch Square. This was a handsome building but seventy years later it was again found to be too far east, a comment on the rapid growth of the city westwards. In 1860, the Hall was sold to William Teacher for £5,500 and Mr. Panton's house in St. Vincent Street bought for £4,500. It is a great pity that the original scheme of building a new hall was not followed, but the premises were enlarged by the building of a large hall in 1892 and by the purchase of the second house in 1900.

In 1792 the Royal Infirmary was founded. This event raised the standard of Glasgow medicine immensely. Clinical teaching was instituted immediately. The Faculty took a great part in both the professional and administrative duties of the institution until very recent times.

The nineteenth century opened with the Faculty in the midst of very stormy proceedings and, indeed, fighting for its very existence. It closed with the Faculty strong, recognised, and flourishing. By 1801, the establishment of the Royal Infirmary had made the monthly dispensary of the members no longer necessary. With great foresight, the Faculty established in its place one of the earliest vaccination stations in the United Kingdom. As Edward Jenner conducted his famous experiment on James Phipps in 1796, the adoption of his system only five years later shows not only the universal appeal of any measure to protect against the dread disease of smallpox but also that the Faculty was fully alive to modern advances in medicine. It was an immediate success and ten thousand persons were gratuitously vaccinated in the space of five years. The vaccination station then set up was continued until 1896 when the public authorities took over this duty.

The main task of the Faculty in the first forty years of the century was the establishment of its position as a corporation with powers by Royal Charter. At this time many practitioners were acting in the city unlicensed by the Faculty. These persons were occasionally brought to justice, but the cost of prosecuting them was great and the penalties imposed, small. A new class of unlicensed practitioners began to appear.

In the original Charter the physician was envisaged as one who had purely consultant status, who did not dispense drugs, and who dealt purely with internal diseases. Many M.D.'s had appeared in Glasgow partly because of the deplorable habit of certain Scottish universities of granting the degree on payment of a fee without supervising training or even demanding an examination, e.g. Jean Paul Marat was an M.D. of St. Andrews. These persons began to practise general surgery which was the privilege of Faculty members and licentiates only.

Something had to be done if the Faculty was not to lose its function. A letter was written to the Town Council which, while sympathetic, could see no action it could take. In 1812 an Act of Adjournal of the High Court encouraged the Faculty to exercise its powers and prosecute persons practising surgery whom it had not examined. It also called upon the law officers to uphold the rights of the Faculty. In 1815, therefore, the Faculty prosecuted four graduates, one from each Scottish university. The case went to the Lord Ordinary who decided that M.D.'s could practise medicine but no part of surgery or apothecary.

Both the Faculty and the University began to think out methods of strengthening their positions. The University obviated this difficulty by instituting the degree of C.M. in 1816 which they hoped would have the same recognition as the M.D. and be operative "ubique terrarum." The Faculty decided to change its name to the Royal College of Physicians and Surgeons of Glasgow, and a new charter reached the Lord Advocate's Department under the warrant of the Prince Regent in 1817. This was opposed by the University and by the Royal College of Surgeons of Edinburgh and allowed to drop.

In 1819, the Faculty took action against twenty-three persons holding only the degree of C.M. and practising in Glasgow. The University sprang to the defence of its graduates and thus started the dismal controversy which was not to end until the House of Lords gave judgment in favour of the Faculty in 1840. The unanimous decision of the Second Division of the Court of Session on the Faculty rights as a corporate body is perhaps worth quoting. "Few cases have occurred, if, indeed, any one, in which the possession of corporation privileges for nearly two centuries and a half had been proved by such overwhelming evidence." This legal battle had many unfortunate repercussions and embittered for many years the relations between the Faculty and the University, two bodies whose ultimate aim was the same, namely, the proper training and supervision of the medical profession. Fortunately, the breech is healed and very cordial relations now exist. On the other hand, the highest court in the land has given judgment that the Faculty is in every way properly constituted and equal in its rights to all the other Royal colleges.

In 1850 an Act of Parliament was passed which relieved the Faculty of the grievous burden of its Widows Fund instituted in 1792. It also allowed the Faculty to elect Fellows and in return the Faculty gave up its territorial monopoly of practice in the city.

During this time, and until the passing of the Medical Act of 1858, the Faculty was in danger of complete extermination. In bills relating to the profession of medicine, which were many in those days of medical reform, the English and Edinburgh legislators were apt to overlook the rights of the Faculty to be a licensing body equal to the Royal Colleges. Consequently, its diplomas were often unrecognised in proposed national legislation. It is to the great credit of the Fellows of the time that no bill ever reached the Statute Book without the due place of the Faculty being recog-

nised. The Medical Act of 1858 finally gave proper recognition to the Faculty and ensured it a seat on the General Medical Council since when none has dared gainsay its rights.

The minutes of the last hundred years are largely concerned with domestic affairs. Sometimes we find it generous in national causes, as in its subscriptions to the war against Russia, to the wounded of the Franco-Prussian war, and to the Belgian doctors in 1914. Sometimes we find it helping locally, as in its advice on the cholera epidemic of 1854, its subscription to the ruined depositors of the City Bank on whose account the annual dinner was cancelled, and the five hunded guineas subscribed towards the erection of the Western Infirmary. In the institution of most of the charities of Glasgow it was active, serving in the hospitals and on the boards of governors. The Humane Society was a true child of the Faculty. Recently it has been deprived of the privilege of serving the community in this way but perhaps it will arise again in its presence on numerous committees in connection with the National Health Service.

To mention all the famous members of our corporation would be impossible but some interesting names might be noted. Sylvester Rattray entered the Faculty in 1657. He was a graduate of St. Andrew's University and a great upholder of the doctrine of sympathy and antipathy. His was the first medical book to be published in Glasgow (1658). Robert Mayne was the first professor of medicine of the University and he entered the Faculty in 1645. Robert Houston carried out the operation of ovariotomy in 1701, over 100 years before Ephraim McDowell. His patient survived for 13 years. He was visitor in 1691. William Smellie, Robert Watt, Joseph Lister, and William Macewen are too famous to require further notice here. Granville Sharp Pattison entered the Faculty in 1813. He was professor of anatomy and surgery at the Andersonian University and from there founded chairs of anatomy at Maryland, Philadelphia, and New York. Robert Perry distinguished between typhoid and typhus fever. William MacKenzie was the foremost ophthalmologist of his day and founded the *Glasgow Medical Journal.* Thomas Thomson and Thomas Graham were internationally famous chemists. David Livingstone's medical qualification was the licentiateship of the Faculty and he was made an Honorary Fellow in 1857.

The name of the corporation gave rise to some difficulty in the lawsuit against the University and it took some considerable time

before a fixed name was used. At its institution the Faculty consisted of Lowe, Hamilton, and "their successouris, indwellers of our citie of Glasgow." For the next thirty years, the usual appellation is the "Brethren" of "Craft" of chirurgerie. In 1629 the name "facultie" appears in the Minutes for the first time and in 1654 the usual reference is to the Facultie of Chyrurgyeons and Physitians. By 1700, the name had crystallised as the Faculty of Physicians and Surgeons of Glasgow. In 1910, largely by the efforts of the late Professor John Glaister, King Edward VII was graciously pleased to grant the right to use the title, "The Royal Faculty of Physicians and Surgeons of Glasgow."

This necessarily short account of the development of the Royal Faculty does much less than justice to its history. There are still several points which require illumination and it is to be hoped that while the past history of the Faculty is being discovered, an honourable future history is also being made.

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Notes and Queries

Edited by Dorothy M. Schullian, Ph.D.*

Axel Erik Waller, 1875-1955

Dr. Axel Erik Waller, the foremost medical book collector of our time, died at Lidköping, Sweden, on 28 January 1955, in his eightieth year. Born on 29 November 1875, Dr. Waller had the usual schooling of the well-born Swede and he took his medical degree at Uppsala in 1900. He held several teaching posts, first in anatomy, and later in pathology, at Uppsala, but he received his principal training in surgery at Stockholm in the Serafimerlasarettet where he had experience both in general surgery and in gynecology. In 1909 he was appointed as physician and surgeon-in-chief at the well-known Swedish hospital at Lidköping where he continued to serve until his retirement in 1933. Waller traveled widely, working at Newcastle, Leeds, Edinburgh, and Liverpool, and on the Continent at Vienna, Jena, Würzburg, Heidelberg, and Halle, and after the war in Rostock, Hamburg, Munich, and Leipzig. When he began to collect books on the history of medicine, he also went to many other European capitals.

Waller had a remarkable career, both as surgeon and as one of the great medical humanists of this generation. While in Lidköping he carried an overwhelming responsibility in surgery, having to his credit more than two thousand operations a year for a period of more than twenty years, or an average of six to seven major procedures a day. On top of all this, he began to collect books and amassed the most extensive private collection on the history of medicine ever to be brought together by a single individual, a library numbering nearly 25,000 volumes; indeed, the only comparable collection of which there is record is that of the eighteenth century London physician, Richard Mead. Waller's interests were wide and included not only early surgical texts, but herbals, many incunabula, and a vast number of literary writings by and about physicians. Shortly before Dr. Waller's death he gave his library to the University of Uppsala, his alma mater, and the collection was transferred to the Library at Uppsala some two years ago. Medical collectors throughout the world and Erik Waller's many friends will be gratified to learn that a complete catalogue of his library is now in press and will shortly be published by the authorities at Uppsala.

Dr. Waller personally was a most kindly and friendly man, and his friends were legion. The late Harvey Cushing developed a great affection for him, for no two men could have had more in common. Dr. Cushing enjoyed telling the tale of an occasion on which Dr. Waller had met him late at night at Göteborg, motored him half way across Sweden, and how at

* Cleveland, Ohio.

three a.m. they enjoyed a ten-course dinner with Dr. Waller's friends, who had waited up for the occasion, and how during the meal one rare book after another was circulated about so that most of the guests forgot about eating. Dr. Cushing also related that the next morning Dr. Waller was in his operating room at seven-thirty; and there are many other anecdotes about this indefatigable man. As a surgeon his technique was impeccable, especially in abdominal surgery, and on occasion he also entered the field of neurosurgery, though he usually referred cases of brain tumor to his colleagues in Stockholm. Waller will be missed by a wide circle of friends and admirers not only in Sweden, but throughout the world.

Dr. Waller is survived by his wife, the former Karin Erika Vilhelmina Modigh.

J. F. F.

Sir Alexander Fleming, 1881-1955

The Journal regrets to record the death on 11 March 1955 of the eminent bacteriologist, Sir Alexander Fleming of St. Mary's Hospital, London. Born of humble parents in Ayrshire in southwestern Scotland, Fleming, through his native ability, industry, and extraordinary memory, became an almost legendary figure even during his lifetime. As a boy he went to London to work as a shipping clerk, and from his meager salary saved enough to get himself started in medicine. He became a student at St. Mary's Hospital Medical School at the age of twenty, and won practically all the prizes and scholarships available during his course. Shortly after he qualified he became an assistant to Sir Almroth Wright under whose stimulus he finally decided to take up the study of bacteriology. The association of the two men continued, in peace and in war, for almost four decades, and it is most fitting that one finds at St. Mary's today a doorway over which is inscribed "Wright-Fleming Institute of Microbiology."

Fleming's discovery of lysozyme was made in 1922. At that time he found in the nasal secretion of a patient with an acute coryza an element which had the power to dissolve bacteria. This element, present also in tears and other body fluids, he isolated and named lysozyme.

There is a story (possibly apocryphal, though it is related by his biographer, L. J. Ludovici) that has to do with the discovery of penicillin. Hard-working and also very absent-minded, Fleming was apt to have a hasty meal at midday. On one occasion, when intending to eat his customary sandwich, he picked up the wrong package and ate a sandwich that was two weeks old and full of mould. Boils which had developed on the back of his neck as a result of overwork and neglect of diet forthwith disappeared and he reasoned that there must have been something in the mould which killed the bacteria. The more usual version of his discovery is that when he left the top off a petrie dish in which a culture of Staphylococci was being grown, a mould that blew in through a window was deposited on

the dish and destroyed all the bacteria in its vicinity. Fleming realized that such a mould must produce a powerful anti-bacteriological agent, and since he had identified the mould in question as *Penicillium notatum* he called the new agent extracted from it "penicillin." He recognized that penicillin might be valuable in treating infections in human beings, but he was interested in other things and did not pursue the clinical trials which he had originally envisioned. The isolation, purification, and clinical application of penicillin were achieved ten years later by Howard Florey and his Oxford associates, Norman Heatley and Ernst Chain. In his Nobel Prize lecture delivered at Stockholm in December, 1945, Fleming, when referring to his discovery, modestly stated:

> It arose simply from a fortunate occurrence which happened when I was working on a purely academic bacteriological problem which had nothing to do with bacterial antagonism, or moulds, or antiseptics or antibiotics. In my first publication I might have claimed that I came to the conclusion as a result of serious study of the literature and deep thought, that valuable antibacterial substances were made by moulds, and that I set out to investigate the problem. That would have been untrue, and I preferred to tell the truth, that penicillin started as a chance observation.

Fleming had a Scottish sense of humor and never really objected to jokes at his own expense. When he was honored by the Medical Society of the Vienna General Hospital in 1947, a Bateman cartoon appeared in *Punch* with the caption, "The only F.R.C.S. [Fellow of the Royal College of Surgeons] who never did a real operation." His mind was quick and he had a ready wit. One day, going up in a lift in the Biltmore Hotel in New York, I heard an over-zealous journalist ask, "Say, Dr. Fleming, is this penicillin of yours good for a hangover?" Without a moment's hesitation, Fleming retorted, "Heavens, no! It's not that good."

In 1947 when he spoke at the Pasteur exhibition in Paris, he quoted the following stirring lines from Pasteur:

> I would say that two contrary laws seem to be battling with each other nowadays: the one a law of blood and death, ever imagining new means of destruction and forcing nations to be constantly ready for the battlefield—the other a law of peace, work, and health, ever evolving new means of delivering man from the scourges which beset him. Which of these two laws will ultimately prevail? God alone knows.

J. F. F.

Max Neuburger, 1868-1955

The venerable medical historian, Max Neuburger, whose indefatigable pen during the past sixty years has so enriched the literature of historical medicine, died at Vienna on 15 March 1955. Following the Hitler occupation of Austria, Dr. Neuburger sought haven first at the Wellcome Historical Medical Museum in London, and later in this country with his son in Buffalo. When things had become more settled in Austria he promptly

returned to Vienna, and on reaching his decision he wrote the following letter to the author of this notice:

> I regard it as my duty to communicate it to you that I intend to leave Buffalo in course of the next weeks for Vienna (Austria) where I have been invited to return. There are principal financial reasons why I am going to my homeland, as I have been guaranteed by an official letter of the Austrian Ministry of Education that I can get after my arrival in Vienna the pension of a former full professor at the University.

Dr. Neuburger had received his early education at Vienna, and in 1917 became professor of medical history, a post which he held until 1934. At his museum, the Josephinum, many a student had received a most cordial reception and the inspiration of his example.

In the field of the history of medicine Dr. Neuburger was best known for his monumental three-volume *Handbuch der Geschichte der Medizin* and for a later two-volume résumé on the subject which subsequently appeared in an English translation by E. Playfair. He was also the author of more than two hundred journal contributions. Although he had been somewhat overshadowed by Karl Sudhoff, one can agree whole-heartedly with Dr. Charles Singer, who said in his recent notice in *The Lancet* for 26 March: "Until his death he remained, by general consent of all who have any knowledge of the subject, the most important historian of medicine in the world."

A full notice concerning Dr. Neuburger will appear in a forthcoming number of the Journal.

J. F. F.

Patrick Black and the Administration of Chloroform

During the early days of the introduction of anaesthetics into hospital practice, the administration of chloroform was often entrusted to the dressers. Accidents were not infrequent, and for this reason John Snow (1813-1858) frequently insisted that a specialist should perform this duty. At St. Bartholomew's Hospital, London, Samuel John Tracy (1813-1901) administered chloroform until 1849, when he was appointed Dentist to the Hospital, after which there was no official anaesthetist at the Hospital for three years.

Patrick Black (1813-1879) was appointed the first official Administrator of Chloroform to St. Bartholomew's Hospital on 27 April 1852, but also held several other appointments at the Hospital and elsewhere. His private practice was small, and Black had little faith in therapeutics. As a diagnostician he had few equals, and built up a reputation as a scholarly gentleman, painstaking and thorough in his work. His lectures were carefully prepared, yet failed to impress the students of the Medical School. He could write attractively, although unfortunately his published material was confined to a few pamphlets. One of these was entitled *Chloroform: how shall*

we ensure safety in its administration? which was published by John Churchill in 1855, a pamphlet which appears to be quite rare. In this, Black considered the possible causes of death under chloroform, and although he praised the writings of John Snow, Black preferred to differ from Snow in this matter. Snow was of the opinion that death under chloroform was caused by "paralysis of the heart," following the inhalation of a too highly concentrated mixture of chloroform, but Black was firmly convinced that death was due to asphyxia, the pungent chloroform not being respirable in the primary stages of administration. Unfortunately this theory was not upheld by his contemporaries, but Black was himself a very careful administrator of chloroform, and it is not recorded that he had any "accidents" during the four years that he was Administrator of Chloroform to St. Bartholomew's Hospital.

Sir Norman Moore recounts an anecdote illustrating Patrick Black's disbelief in the value of therapeutics. During his last illness, Black was visited by Moore, and the former, pointing to a bottle of medicine beside the bed, remarked, "I need hardly tell you that this is only here out of complaisance to a colleague." Black died on 12 October 1879 of cancer of the pancreas. It is of interest to record that Norman Moore was clinical clerk under Patrick Black, and that one of the latter's grandsons, also named Patrick, served as house physician to Norman Moore.

Thornton, J. L. Patrick Black (1813-1879), first "Administrator of Chloroform" at St. Bartholomew's Hospital, London. *Anaesthesia*, 1955, *10*, 70-73.

Moore, Sir N. *The history of St. Bartholomew's Hospital*, 1918, 2, 566-567.

JOHN L. THORNTON

An Early American Report on Jacob Helm's Work on Human Digestion

Recently a report was made in this journal[1] on the experiments on human digestion of the Viennese doctor, Jacob Helm, performed on a female patient with a fistula of the stomach. Helm published his observations in a preliminary report in 1801, and with all details in a book entitled *Zwey Krankengeschichten* which was printed in Vienna in the year 1803. It was mentioned[1] that the work of this forerunner of Beaumont's world-renowned experiments was entirely neglected in his own homeland, Austria, and in Germany, except for some remarks in E. von Brücke's textbook of physiology. This seemed not easily understandable, since Helm's book was reviewed in some of the German scientific journals of his time.

In regard to Beaumont's experiments, it was of considerable interest to ascertain whether the knowledge of Jacob Helm's work had penetrated in the first quarter of the nineteenth century beyond the boundaries of Germany and Austria. I had not been able to find any such traces before, but recently my attention was called to an article in *The Medical Reposi-*

[1] Bruno Kisch, Jacob Helm's observations and experiments on human digestion. *J. Hist. Med.*, 1954, *9*, 311-328.

tory.[2] This article led to some further investigations, which seemed of interest for the history of human chymology in the period before Beaumont.

Professor Benjamin Waterhouse (1754-1846), famous as the first pioneer of Jenner's vaccination in the United States, famous also as professor at Harvard University, was, through his endeavors in vaccination, in correspondence with the outstanding physicians of all countries. One of his correspondents was Dr. Jean De Carro in Vienna (1770-1856), also known as one of the early followers and admirers of Jenner and vaccination. Perhaps through De Carro, Waterhouse became aware of Helm's work and immediately realized its great importance. A year after the publication of Helm's book Waterhouse gave a public lecture at the close of the medical course in the Chapel at Cambridge on 20 November 1804. This lecture had the purpose of advising the students how to keep their bodies and their minds fit for the demands of life, warning them strongly against the use of alcohol and tobacco and "more especially the pernicious effects of smoking cigarrs." This lecture was published as a booklet in 1805.[3] In this publication, on pages 16 and 17, Waterhouse mentions that an extremely rare opportunity to observe directly the functioning of the stomach had been offered in the case of a woman who was observed in the General Hospital in Vienna in 1798, and quotes correctly Helm's main experiments especially about the coagulation of milk through stomach juice, and the stimulation of the production of stomach juice by mechanical irritation of the wall of the stomach. It matters little that he misspells the name of the author as Dr. Helme. Three years later, when Waterhouse was preparing a new edition of this lecture, he wrote the above-mentioned letter to the editor of *The Medical Repository*, Mitchill, who published it. Waterhouse complained there that the mention of Helm's patient in the first edition of his book had occasioned some merriment at his expense, because people who read it simply did not believe that such a condition was possible, and that even his friends advised him seriously to omit in the next edition the story of the German woman "with a hole in her stomach." Waterhouse, not too much impressed by this criticism, turned instead to his correspondent in matters of vaccination at Vienna, Dr. De Carro, for his opinion about the reliability of Dr. Helm's report. The answer he received is published in his letter, which gives us also some information on Jacob Helm, whose life story is still to be explored. It turned out that De Carro was well acquainted with Helm, who himself, as we know, was one of the pioneers of vaccination in Vienna,[1] and he confirmed the truth of the story, giving high credit to

[2] Remarks on the function of the stomach and on the singular case related by Jacob Helm, physician in Vienna, etc. in a letter from Professor Waterhouse to Professor Mitchill, dated Cambridge, March 5, 1808. *Medical Repository*, vol. VI, Second Hexade, New York, 1809, 1-5. I am obliged to Mrs. Gottlieb of the Old Hickory Book Shop in New York for making me aware of this article.

[3] Benjamin Waterhouse. *Cautions to young persons concerning health, in a public lecture delivered at the close of the medical course in the Chapel at Cambridge, Nov. 20, 1804*. . . . Cambridge, University Press, W. Hilliard, 1805.

the accuracy of Dr. Helm's report. He further sent a copy of Helm's book to Waterhouse, which may still be found in some library in the United States, but Waterhouse confessed that he himself could not read it for lack of knowledge of the German language. A footnote to the article presents a careful excerpt, one page long, of the main findings of Helm's book, translated by S.L.M. These initials stand for Samuel Latham Mitchill, "professor of Natural History in the University of New York, and Senator in the Congress of the United States," who was one of the two editors of *The Medical Repository*. This footnote is indeed an excellent abstract of Helm's work, and Waterhouse took it over into the later editions of his booklet. It therefore ought to have been widely known in the medical world of the United States. Waterhouse himself also came into direct correspondence with Dr. Helm, who sent him, as a proof of his experiments, the identical perforated tubes of wood and of metal and the little linen bag which he used in investigating his patient.

The book of Waterhouse aroused no little attention among outstanding medical men and laymen. He received many letters concerning his publication and later on published some of them, for instance those by Benjamin Rush and President Jefferson. Waterhouse's book, as he mentioned in the preface to the second edition, was repeatedly re-published elsewhere too, and also translated into other languages. One edition was published in London, one translation into French at Geneva; a translation into German by De Carro was published in 1808 at Vienna. The book was also reprinted in South Carolina with comments by "the late eminent historian and physician, Dr. Ramsay." In the United States the fifth edition of the book, under the same title as the first, was published in Cambridge by the University Press (Hilliard and Metcalf) in 1822, only a few years, therefore, before the first edition of Beaumont's work. As late as 1869 an American insurance company published a reprint of the pamphlet, or rather an excerpt of it, with omission, however, of the footnote concerning Helm.

Therefore, there cannot be any doubt that in the period between 1805 and 1822 laymen as well as the medical world were acquainted with the outstanding work of Helm and the sensational and almost incredible story of the experiments of the German doctor on a woman "with a hole in her stomach." This raises again the question whether either Beaumont himself, or any of his medical friends, could have been unaware of Jacob Helm's publication.

BRUNO KISCH

Annotations on the Biblical Aspects of Fulton's Servetus

The vast literature bearing upon Servetus has been enlarged by the recently published monograph *Michael Servetus, Humanist and Martyr,* by John F. Fulton.[1] It is remarkable that such an enormous amount of infor-

[1] New York, Herbert Reichner, 1953, 98 pp.

mation could be presented to the learned reader in a volume of only 98 pages. Highly readable, interwoven with numerous, wisely chosen quotations, but nevertheless tense and concise, the volume represents a new type of medico-historical monograph writing. It contrasts with the conventional type prevailing during the nineteenth and the beginning of the twentieth centuries and even with Fulton's own monograph on Harvey Cushing.[2] With this work Fulton inaugurates a new technique of scholarly medical historiography, a manner of presentation which is more appropriate to the needs of the recent, more intense phase of our civilization.

In the special case of Servetus the new type of presentation has been much facilitated by the work of numerous precursors. Fulton evidently realized this fully when he dedicated the volume to three earlier Servetus scholars. The Bibliography of Servetus' writings in the fifth and concluding chapter was compiled in a masterly fashion by Miss Madeline E. Stanton and is an outstanding feature. By concentrating the bibliographical material in a separate chapter, the forceful and dramatic presentation is enhanced instead of being hampered by too many and often obstructing details.

The central medico-historical problem of the volume is of course Servetus' discovery of the lesser circulation. Certainly Servetus was a physician, well trained in human dissection, as attested by his master Guinterius of Paris, who in the preface of a new edition of his *Institutiones anatomicae*, 1539, mentions him with great praise (Fulton, p. 22). But the discovery of the lesser circulation was incorporated, or rather submerged, in his theological book *Christianismi restitutio*, on pages 168-172 of the original text. This has been stressed by Professor C. D. O'Malley, who in a remarkable paper[3] points out that "in the final analysis Servetus' account must be considered not as anatomical or physiological, but rather a theological argument." Servetus was not only a Biblical scholar, but he also "urged Biblical scholars to learn Hebrew" (Fulton, p. 33), and it seems that he himself did so when he revised and edited the Latin translation of the Bible by Pagninus. A "literal biblicist" (O'Malley, p. 388), he dwelt on the original Hebrew passages of the Bible, and these led him to his great discovery in physiology. It was a new and thrilling task for a Christian biblicist—even after Pico della Mirandola and Reuchlin—to make acquaintance with the original Hebrew Bible. This stirring feeling comes out in the third and the fourth line of the title-page of his *Biblia Sacra*, 1542, where Servetus speaks of the newly established Hebrew learning of the age and terms his edition "ad Hebraicae linguae amussim novissime . . . recognita." A detailed examination of the Biblical passages which led Servetus to his immortal discovery may therefore be attempted.

[2] Fulton, John F. *Harvey Cushing, a biography*. Springfield, Ill., Charles C Thomas, 1946, 754 pp.

[3] O'Malley, C. D. "The complementary careers of Michael Servetus: theologian and physician." *J. Hist. Med.*, 1953, *8*, 378-389.

"The subtle blood is urged forward by a long course through the lungs; it is elaborated by the lungs, becomes reddish-yellow and is poured from the pulmonary artery into the pulmonary vein," (Fulton, p. 38, using O'Malley's translation). These are the simple and quasi-"modern" words of Servetus, engraved on one of the most significant milestones of medical history. He could proudly announce "a truth which was unknown to Galen" (Fulton, p. 39). It may appear rather petty to comment on Biblical quotations and on the theological and often nebulous background of the discovery; but this background is so unique in the history of medical discovery that its examination may help one to understand the interest Servetus took in pulmonary circulation.

Besides indicating three chapters from the Pentateuch as sources, viz. *Gen.* 9, *Levit.* 17, and *Deut.* 12, Servetus refers (Fulton, p. 38) also to Genesis 2, 7, "God . . . breathed into his nostrils the breath of life." Since his starting-point was the identity of soul with the blood, the creation of Adam as described in the Bible urged him to suppose a more important rôle for breathing and hence the process of life than was admitted by Galen. The end of the verse being "and man became a living soul," Servetus was obliged to postulate the return of the vitalized blood to the heart after being elaborated by the lungs. He was not satisfied with the Galenic theory that "the communication is made through the middle wall of the heart," because in this fashion he could not properly interpret the central meaning of "breath" through which man *became* a living soul. He resorts to his philological knowledge and states (Fulton, p. 37) that "in Hebrew 'spirit' is represented in the same way as 'breath.'" Thus the generally accepted doctrine of the "spirits" finds in his view a happy link with the "breath" in the record of Adam's creation. From here he proceeds to his clear anatomical proofs of the lesser circulation, gently reassuring the reader that he will easily understand the divine philosophy if he has been trained in anatomy.

It may be appropriate now to examine the three Biblical passages enumerated by Servetus to which he ascribed a higher meaning ("as is taught by God himself in . . ."), since they were in his mind the starting-point for his discovery. Their importance is clear from their typographical position in the original text, for they occur immediately before the paragraph which describes the discovery of the pulmonary circulation (Fulton, p. 38 and Fig. 7). These verses are:

*Gen.*9,4: "But flesh with the life thereof, which is the blood thereof, shall ye not eat." This rendering in the King James' version is not a literal translation; it suffers from undue length, and is rather an attempt at explanation. So "soul" is rendered "life," just as it was by Luther, here and in *Levit.*17,14. Servetus would not have agreed with these translators. Closer to the original are the newer Catholic French version and the modern German by Buber: "Seulement vous ne mangerez point de chair avec son âme, c'est à dire avec son sang"; "doch Fleisch mit seiner Seele, seinem Blut sollt ihr nicht essen."

*Levit.*17,14 (not *Levit.*7 as misprinted in Fulton, p. 38): "For it is the life of all flesh; the blood of it is for the life thereof: therefore I said to the children of Israel, Ye shall eat the blood of no manner of flesh; for the life of all flesh is the blood thereof," etc. Again the French Crampon and the Buber versions run: ". . . car l'âme de toute chair, c'est son sang"; "denn die Seele alles Fleisches, sein Blut ist."

*Deut.*12,23: "Only be sure that thou eat not the blood: for the blood is the life; and thou mayest not eat the life with the flesh." The corresponding French and German versions are: ". . . car le sang, c'est l'âme" . . . and "denn das Blut ist die Seele." In contrast to the previous quotations Luther here does choose the word soul for nefesh-anima: "denn das Blut ist die Seele, darum sollst du die Seele nicht mit dem Fleisch essen."

Imbued with inspiration by the scriptural texts Servetus departed from them for his excursions into the field of physiology. The first step was determined by the rôle of breathing as revealed in the story of Adam's creation, whereby man became a living soul. Then he associated breathing with wind, the prototype of motion, which is the feature of life. Since the "vital spirit" of Galen was the acknowledged working hypothesis of the medical world of his time, Servetus was impelled to associate the vital spirit dwelling in the heart and vessels with the newly conceived importance which he had assigned to breathing in the process of life. These ideas would have been lost in speculation had he not had the sound background of skillful human dissections. Thus the "divine philosophy" helped the trained anatomist in the achievement of the first written report on the lesser circulation.

The text of the discovery is now available in the excellent new rendering by Professor C. D. O'Malley, which according to Fulton surpasses the older translations; it is reproduced on pages 37-40 of his book. The rendering is presented to the reader in plain modern language, yet preserves fully the dignity of the original text. The only question which arises concerns O'Malley's translation of "anima" (cf. note 28 on p. 40). This word is rendered "Divine Spirit." It is known that Servetus based his theory on Biblical texts; however, in all of them the word "nefesh" means soul; Divine Spirit is, in the Bible, always represented by the word "ruah." If "anima" means Divine Spirit, then it would have been impossible for Servetus to write "Hinc dicitur anima esse in sanguine, et anima ipsa esse sanguis," etc. It seems hardly believable that a deeply religious man could have frankly identified the blood running in the vessels of men and animals with the Supreme Being. Servetus' statement "Anima ipsa esse sanguis" is taken word for word from *Deut.* 12,23, where of course "anima" is soul. So it seems that Professor Bainton's use of "soul" for "anima" in his translation, even if it "does not always work" (Fulton, p. 40, note 28), comes nearer to the meaning of Servetus' Biblical evidence.

Apropos of the interesting remark of O'Malley as to the translation of the word *flavus*, which is believed to record the observation that the arterial

blood is brighter than the darker venous blood, in post-Biblical Hebrew there exists a word for yellow, zahov. Usually designating yellow color, this root is used several times also in the meaning of bright (Babylonian Talmud, Tractate Menahot, fol.18ª: "the face of . . . became bright, cheerful." Even in Biblical Hebrew such a meaning occurs occasionally, as in *Ezra* 8, 27. Buxtorf's translation is "fulgens," namely, bright, brilliant.

Servetus' crucial phrase "Hence it is said . . . that the soul [O'Malley: Divine Spirit] is itself the blood, or the sanguineous spirit" (Fulton, Fig. 7; top of the page) is followed soon by the words "as is taught by God himself in *Gen.* 9, *Levit.* 17 and *Deut.* 12." It is therefore of some importance to consider the views of two eminent Jewish authorities on these verses of Scripture.

Abraham Ibn-Ezra (1092-1167) was held in high esteem as commentator, Hebrew grammarian, and astrologer not only by Jews but also by Christian scholars, especially in Servetus' time.[4] It is probable, though not certain, that he also wrote medical treatises.[5] Now in the commentary to *Gen.* 9,4 he writes: " 'But flesh with the soul thereof, which is its blood, shall ye not eat'; as it is also said (in *Deut.* 12, 23) 'Ye may not eat the soul with the blood,' and (*Levit.* 17, 14) 'for the soul of all flesh, its blood is in its soul,' and this is the soul of the movement and feeling, which is the (animal) body." Here Ibn-Ezra enumerates in the same way as Servetus the three decisive quotations and gives also the definition of the soul as a biological entity.

Moses Maimonides (1135-1204) refers to the term nefesh as anima in his philosophical work *Guide of the Perplexed,* which was translated into Latin in the first half of the thirteenth century. In the first of its three parts, which is largely devoted to definitions, in chapter 41, we read: "nefesh is a conjoined name (i.e., having different meanings); it is the name of the feeling soul common to all feeling beings which have a living soul; and it is *also the name of the blood* ('Ye may not eat the soul with the flesh' *Deut.* 12, 23; and it is also the name of the speaking soul, i.e. the human being. And it is also what remains of man after his death," etc. The influence of Maimonides upon the Christian theology is well established (Albertus Magnus, Thomas Aquinas, etc.).

It is striking how near Servetus came to the opinions of the two early Hebrew scholars mentioned above when he said, "Anima ipsa esse sanguis." In view of the appeal which Hebrew learning had for him and the fact that Ibn-Ezra as well as Maimonides were well known among Christian Biblical scholars, an interrelation between his ideas and these Hebrew authorities may appear not impossible.

[4] Sarton, George. *Introduction to the history of science.* Baltimore, Williams and Wilkins, 1931, II, 187-189.

[5] Leibowitz, Joshua O. "The book of medical experiences ascribed to R. Abraham Ibn-Ezra." *The Hebrew med. J.,* 1954, pp. 151-159, 221-223.

CHRISTIANI-
SMI RESTITV-
TIO.

Totius ecclesiæ apostolicæ est ad sua limina vocatio, in integrum restitutæ cognitione Dei, fidei Christi, iustificationis nostræ, regenerationis baptismi, & cœnæ domini manducationis. Restituto denique nobis regno cœlesti, Babylonis impiæ captivitate soluta, & Antichristo cum suis penitus destructo.

נפלת תורה יעבור ביבמה חשר
καὶ ἐμόγησε πλάσμα ἐν τῷ ληφανῷ.

M. D. LIII.

BIBLIOTHEQUE ROYALE

Title-page of 1553 edition in the Bibliothèque Nationale.

A few remarks may be added by way of comment on the beautiful title-page of *Christianismi restitutio* reproduced as Figure 6. Following the amplified title and preceding the date of printing, a line in Hebrew characters is inserted. The forceful outline of these characters shows that they were taken from the then existing famous Basel printing houses[6]; they are clearly distinct from the taller and thinner letters used in the contemporary Paris presses, as for instance in the artistically produced Hebrew Bible published in 1548 by Robertus Stephanus. The line in Hebrew is the beginning of the twelfth chapter of Daniel: "And at that time shall Michael the prince stand up." It was rather usual for the Renaissance scholars to adorn the title-pages of their Latin works with Hebrew and Greek quotations. Hebrew words are to be found even later on emblems, as for instance on that of Yale University. But why did Servetus choose this particular Hebrew quotation? First, it would seem, because of the name Michael, that of the Archangel ("the prince which standeth for the children of thy people," *Dan.* 12, 1), which was his own Christian name. For an author to put his own name even into the title of his work was, incidentally, a widespread practice with Hebrew theologians. Thus the well-known ritual commentary on Maimonides by Rabbi Joseph Caro is named "Beth Joseph" (House of Joseph). Secondly, of all Biblical books that of Daniel was the most apocalyptical and nearest to Servetus' frame of mind. Finally, the metaphorical meaning of Michael's "standing up," that is with the aim of struggling for truth, seemed to him a scriptural incarnation of his programme.

This short line of Hebrew quotation shows Servetus' familiarity with the Hebrew language. Indeed, the printed words depart in two small items from the original text: the first word lacks the initial "u" (—and), and the third word (ya'amod) presents an additional "vav" after the m, not existing in the Biblical text; this letter—as a vowel—has been added according to the usage in post-biblical texts for convenience of the reader. The omission of one letter and adding of another demonstrates that Servetus was at home in handling a Hebrew text.

A final explanatory remark relates to the line of Greek quotation on the title-page of *Christianismi restitutio* ("And there was war in heaven," *Revelation* 12: 7). This line follows the Hebrew one discussed above. It is very likely that it was chosen by the author for very much the same reasons. The words immediately following the phrase in *Revelation* 12: 7 are: "Michael and his angels fought against the dragon" (Dragon perhaps as an allusion to the Antichrist in the amplified title). Here again Servetus reveals his wish to connect his name Michael with the title of the book, this time implicitly only, a rather grievous compensation for the urgent need of concealing the true authorship.

This title-page in Latin, Hebrew, and Greek depicts the cultural indebtedness of the "Homo trilinguus." It follows the humanistic ideals

[6] Cf. Fulton, p. 84; perhaps the acquisition of the Basel Hebrew letters was the only success Servetus attained in his attempt to enlist the service of the Basel printer.

which led also to the foundation of the Collegium Trilingue at Louvain where Andreas Vesalius received his early training. Ten years after the publication of the *De humani corporis fabrica,* in which at some points anatomical terminology was rendered also in Hebrew and in Hebrew characters, appeared the work of Michael Servetus, humanist and martyr. Thus the same cultural indebtedness to the three sources of humanism may be regarded as one of the features, even the mental atmosphere, of the discoverer of the lesser circulation.

JOSHUA O. LEIBOWITZ

1955 Philadelphia Award Conferred on Dr. Esmond R. Long

Dr. Esmond R. Long, Director of the Henry Phipps Institute for the Study, Treatment and Prevention of Tuberculosis and a Past President of the American Association of the History of Medicine, was honored on Thursday evening, 10 March, when the 1955 Philadelphia Award was conferred upon him. Founded in 1921 by Edward W. Bok, the prize, consisting of a beautiful gold medal and a check for $10,000, is conferred each year upon the Philadelphia man or woman who has contributed some act or service during the preceding year which is calculated to advance the best and largest interests of the metropolitan Philadelphia area.

The award was presented by Dr. Alfred N. Richards, Emeritus Professor of Pharmacology at the University of Pennsylvania and a member of the Board of Trustees of the Philadelphia Award. Dr. Long, a graduate of the University of Chicago and of Rush Medical College, served as adviser on tuberculosis to the Surgeon General during the late war with the rank of colonel. He also served as president of the National Tuberculosis Association, the American Association of Pathologists and Bacteriologists, and the American Association of the History of Medicine. In 1954 he was Fielding H. Garrison lecturer at the annual meeting of the American Association of the History of Medicine in New Haven, Connecticut. He was chosen for the award in recognition of his outstanding work in the field of tuberculosis.

The Moorman Award in Medical History

The many friends of the late Lewis Jefferson Moorman will be happy to hear that there has been established at the University of Oklahoma by his friends The Moorman Award in Medical History open to undergraduates and graduate students at the University. Manuscripts, to be eligible for the biennial award (first prize, a fifty dollar bond; second and third, honorable mention), must fall in the following categories: biographies perpetuating the memory of notable Oklahoma physicians, monographs interpreting the rôle of organizations which have worked for the elimination of disease and suffering, improvement of the handicapped, or which in other ways have advanced the profession of medicine in Oklahoma, or special studies of hospitals and organizations engaged in health programs.

This is a most appropriate tribute to Dr. Moorman who, through his own studies in the history of medicine, brought great distinction to Oklahoma and to the University.

The Paneth Codex Acquired by the Yale Medical Library

The Yale Medical Library announced on Alumni Day (22 February) that contributions from sixty Associates of the Library had made possible the purchase of a very fine illuminated medieval medical manuscript. This manuscript, on vellum, measuring 23.5 by 33.7 cm., contains 1378 pages and was written shortly after 1300, probably at Bologna; there is a note at the end which indicates that the volume was finished in 1326. There are many fine miniature initials depicting medical scenes, some done by a North Italian artist, the finer ones probably by a Bohemian artist. There are also many illustrations of surgical instruments rubricated in red and blue.

The codex has been in the possession of the Paneth family for more than seventy years and previously was in the Cathedral Library at Olmütz. It was examined by Professor Karl Sudhoff some twenty-five years ago, and he prepared a list of the texts it contained which was published in the *Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik* (1929, *12*, 1-32). These texts, forty-two in number, represent a cross-section of all medical knowledge, both ancient and contemporary, up to the beginning of the fourteenth century, and are taken from the works of Hippocrates, Galen, Rhazes, Albucasis, Bruno, Roland, and many others.

American Association of the History of Medicine

Twenty-eighth Annual Meeting
Detroit, Michigan
12, 13, 14 May 1955

Under the joint efforts of Dr. A. H. Whittaker of Detroit and Dr. Erwin H. Ackerknecht of Madison, plans for the 28th Annual Meeting are progressing favorably. The Park Shelton, the headquarters hotel, is centrally situated within convenient distance of most of the meeting places. Dr. Whittaker is arranging a series of talks, exhibits, and visits centering about the historical resources of Detroit. Dr. Ackerknecht is sifting out a most interesting group of papers and also plans two symposia: one on philosophy and medicine and one on the history of hospitals.

The Garrison lecturer will be Dr. S. N. Kramer. The dinner speaker on Friday evening will be Dr. Frederick A. Coller.

A visit to the Henry Ford Museum and Greenfield Village at Dearborn, Michigan, will be one of the most enjoyable sidelights that we have to look forward to. Members who wish to bring wives and other guests may be certain that they will be most welcome.

For any further information write either the Secretary of the Association; Dr. Alfred H. Whittaker, Chairman of the Committee on Local Arrangements; or Dr. Erwin H. Ackerknecht, Professor of the History of Medicine, University of Wisconsin, Madison 6, Wisconsin, Chairman of the Committee on Program.

SAMUEL X. RADBILL

Mount Sinai Seminars in History of Surgery

The Department of Surgery at Mount Sinai Hospital in New York has held the following seminars in the History of Surgery during 1954 and 1955: Treatment of Scoliosis from Hippocrates to Hibbs, Milton Glickstein (Discussion, Alvin M. Arkin); Sepsis, Asepsis, and Antisepsis through the Centuries, Stuart Denmark (Discussion, Gregory Shwartzman); Antonio Benivieni's Pathology, Arthur Sicular (Discussion, Saul Jarcho); The Evolution of Endoscopy, Donald Krawitt (Discussion, Stanley I. Glickman); Accouchement through the Ages, Alan F. Guttmacher (Discussion, Claude B. Heaton); Growth of American Surgery from the Civil War to the Twentieth Century, Isadore Mandelbaum (Discussion, Ralph Colp); Leonardo da Vinci and the Heart, Robert J. Wilder (Discussion, Lester Blum); Art and Anatomy, Gerald Weissmann (Discussion, Henry D. Janowitz); The Origin of Public Health in Great Britain, Henry Tankel (Discussion, George Rosen); The Barber Surgeons, Donald Weisman (Discussion, Bernard Simon); The French Influence on American Surgery, Edgar Bick; Ophthalmology in the Middle Ages, Harry Sobotka (Discussion, Frederick H. Theodore and Abraham Schlossman).

Section on Medical History
College of Physicians of Philadelphia

The Section on Medical History of the College of Physicians of Philadelphia presented a series of seven seminars on the methods of teaching medical history at the Hall of the College, 19 South 22d Street, Philadelphia, Pennsylvania, on the evenings of March 3, 10, 17, 24, 31, and April 7 and 14.

These seminars were presented by Dr. Owsei Temkin and Prof. Richard H. Shryock of the Institute of the History of Medicine of the Johns Hopkins University and were financially supported by the medical schools of Philadelphia. Representatives from each of the schools were invited to attend as well as Fellows of the College of Physicians.

Historical Gleanings

On 1 October 1954 the Smithsonian Institution unveiled an exhibit depicting the evolution of surgical dressings from the first crude efforts and through the days of lint soaked in carbolic acid to modern sterile bandages.

The exhibit was prepared under the direction of George Griffenhagen, Associate Curator in the Division of Medicine and Public Health at the Smithsonian, with the support and patronage of Johnson & Johnson, New Brunswick, New Jersey. It features a Peruvian skull some fifteen hundred years old on which the original surgical dressing of finely woven cotton gauze is held in place by several strands of strong woolen cord.

Readers of "Notes and Queries" will be happy to know of the publication of Dr. Ralph H. Major's *History of Medicine,* in two volumes, by Charles C Thomas of Springfield, Illinois. Dr. Major was recently honored by the establishment of the annual Ralph H. Major Lectureship at the Department of Medicine of the Kansas University School of Medicine. In recognition of his scholarship and of his years of devoted service there the Gold-Headed Cane of the department was presented to him at appropriate ceremonies. On 1 July 1955 Dr. Major will become Emeritus Professor of Medicine and of the History of Medicine.

On 12 February 1955 Dr. Robert E. Schlueter died in St. Louis, at the age of eighty-two, from complications following a paralytic stroke. Historians of medicine will always recall his constant and rewarding enthusiasm for the works of Paracelsus which resulted in the formation of an outstanding collection of editions of that author. The collection is now owned by the St. Louis Medical Society; a check-list of it appeared in the *Bulletin of the History of Medicine,* 1941, *9,* 545-579.

On 12 and 13 April, 1955, Dr. Esmond R. Long, Director of the Henry Phipps Institute for the Study, Treatment and Prevention of Tuberculosis, delivered at the University of Kansas the annual Clendening Lectures on the History and Philosophy of Medicine. Dr. Long's first lecture, given in Lawrence, was entitled "The Illness and Medical Care of Frédéric Chopin," the second, given in Kansas City, "The Therapy of Tuberculosis from Hippocrates to Modern Times."

The last issue of "Notes and Queries" carried information on celebrations in Montreal and in Cleveland in commemoration of the 750th anniversary of the death of Maimonides. According to *The New York Times* for 14 January 1955, the celebrations of Maimonides Year in Israel have included to date the opening of an exhibit at the Rav Kook Institution in Jerusalem at which President Izhak Ben-Zvi, Chief Rabbi I. H. Herzog, Minister of Religion Moshe Shapiro, and Rabbi Y. L. Maimon spoke, and a service at the philosopher's tomb in Tiberias, where the year-long commemoration was proclaimed by Dr. S. Z. Cahana, Director General of the Ministry of Religion. The surroundings of the tomb are being beautified, and five hundred synagogues in Israel will be supplied by the Ministry of Religion with tablets bearing the thirteen dogmas of the Maimonides creed.

Precautions against premature burial, which for centuries have endeavored to allay man's unremitting fear of being buried alive, continue to have modern counterparts. Examples for the nineteenth and twentieth centuries were discussed by Howard Dittrick in this journal, 1948, *3*, 161-171. A case for the year 1955 is recorded in *Il Messaggero di Roma* of 11 January. A teacher of Trapani, aged 22, was pronounced dead of an epileptic fit on a Friday by his physician, who stipulated however that, lest the death be only apparent, the "corpse" should not be transported to the cemetery until thirty-six hours had elapsed and that, once there, the coffin should be left open for several days. On the Sunday following a slight increase in temperature was noted in the "corpse," and two injections administered immediately provoked, at least in the opinion of watching relatives, light movements. Meanwhile a crowd had gathered at the cemetery chapel where the body lay, and the intervention of the police was necessary. Apart, however, from a few hypostatic spots there were no further signs of "resurrection," and eventually the sanitary inspector of Trapani confirmed the death.

If this country can display no pharmacies quite as old as the one which still functions at the Campo San Fantin near the fine old theater La Fenice in Venice, it still has at 6 Bowery, on the edge of Chinatown in New York, the Olliffe shop, which was founded in 1805 when De Witt Clinton was mayor of the city. The shop continues to do business in grave and dignified fashion, without a soda fountain and without a public telephone. O'Neill's Mixture, juniper berries, and Becker's Celebrated Eye Balsam are still sold, and not long since a leech, probably from the stock imported by Mr. Salvatore Anatriello and mentioned in this journal, 1953, *8*, 454, was applied in the shop with success to the swollen black eye of the third baseman of the Boston Braves. Modern products are dispensed with the old, but an effort is made to maintain as much as possible of the store's original flavor. An illustrated account of the pharmacy, now managed by Mr. Herbert M. Wilks, appeared in *The New York Times* for 12 February 1955.

With apologies to Tagliacozzi we relate an episode which occurred at Venezia Mestre and was reported in *Il Messaggero di Roma* on 7 December 1954. A driver, aged 72, was endeavoring to load his cart in a confined space and approached the horse with the intention of moving the animal a little to one side. The horse thereupon became excited and quite literally bit off the ear of his owner who, nothing daunted, picked the ear up from the ground, wrapped it in a piece of wax paper, arrested the bleeding by using his handkerchief as a tampon, calmly proceeded to the nearest hospital, and requested the physician on duty to sew the ear back in its normal position. This the physician did, and it was expected that, barring complications, the driver could display again in about twenty days a respectable left auricular appendage.

Book Reviews

POYNTER, F. N. L. *A Catalogue of Incunabula in the Wellcome Historical Medical Library.* Published for The Wellcome Historical Medical Museum by Geoffrey Cumberlege. London, Oxford University Press, 1954. xv, 160 pp., 12 plates. 50s.

Reviewed by THOMAS E. MARSTON, *Curator of Classics, Yale University Library.*

A catalogue of incunabula in the Wellcome Historical Medical Library by F. N. L. Poynter, published for the Wellcome Museum by the Oxford Press in 1954, is the first of a promised series of catalogues of the important library of the Wellcome Historical Medical Museum which was collected over a period of fifty years by the late Sir Henry Wellcome.

The Wellcome collection contains 632 incunabula and fragments of incunabula. Of these 46 are duplicates and 22 are listed as fragments. The preface states that 360 of these books are listed in Dr. Klebs' check-list, *Incunabula scientifica et medica.* Actually there are 362, as Wellcome 359 equals Klebs 595.14, and Wellcome 433 equals Klebs 763.1. Of the remaining 248, many are of medical or scientific interest but fall outside the strict limitations of Dr. Klebs' definition of medical and scientific works.

The collection provides certain marked contrasts. On the one hand it contains many excessively rare and important works, many of these being very fine copies according to the descriptions in the catalogue. On the other hand, excluding books listed as fragmentary, no less than 146 volumes have defects in the text, many of them of major importance. Fortunately for the scholar, most of these defective books are relatively common. (In totalling defective copies, such things as almanacs, etc., usually found in fragmentary state, have been excluded.)

The catalogue itself has many praiseworthy features. As adequate bibliographical references are cited, each description is limited to a description of the actual volume itself, its provenance, condition and binding, when these aspects are of interest, and where and when Mr. Wellcome acquired it. Of greater interest is a listing under author of all the texts contained in the collection with references. Only too often important authors have been lost in the common bibliographical description "with other texts." At the end of the catalogue are two concordances, one with Sir William Osler's *Incunabula medica,* the other with Dr. Klebs' check-list. In view of the large number of items not listed in either of these works, additional concordances with the *Gesamtkatalog* and Hain would have been helpful. Six indices follow the concordances. The first lists names and cross references, the second, subjects, the third, provenance and other signs of ownership, and the fourth, fifth, and sixth, printers, places of printing, and chronology of printing. Twelve plates of considerable interest embellish a well-printed volume.

It is unfortunate to have to criticize such a well-prepared catalogue but it has certain failings. Previously undescribed items are not given adequate bibliographical descriptions, and the author did not establish for himself a standard form for such bibliographical information as is supplied. A second failing creates some confusion at times. All works of a given author are arranged chronologically without regard to title. In the case of prolific authors such as Albertus Magnus, St. Thomas Aquinas, and a few others, the catalogue must be examined very carefully to find the titles of the works of these authors which are in the collection.

The Wellcome Museum should be congratulated on the publication of this catalogue which in effect makes their fine collection available to scholars, and Mr. Poynter should be congratulated on the originality and over-all excellence of his cataloguing which, in spite of the minor defects noted, provides the scholar with a really adequate knowledge of the contents of the collection.

WALTER ARTELT, *editor. Index zur Geschichte der Medizin, Naturwissenschaft und Technik.* Erster Band, im Auftrag der Deutschen Vereinigung für Geschichte der Medizin, Naturwissenschaft und Technik unter Mitwirkung von Johannes Steudel, Willy Hartner, Otto Mahr. München und Berlin, Urban & Schwarzenberg, 1953. vii, 398 pp. 51 D.M.

Reviewed by GEORGE ROSEN, *Professor and Head of the Department of Public Health Education, Columbia University, New York, New York.*

DURING World War II the *Mitteilungen zur Geschichte der Medizin, der Naturwissenschaften und der Technik* suspended publication. This journal had endeavored to survey and to review the pertinent literature on the history of medicine, natural science, and technology *in German as well as in other tongues.* Its forty volumes are today an invaluable reference tool for any student working in the areas it covered. The loss caused by its disappearance was threefold appreciable. However, even before the *Mitteilungen* ceased to appear, it had become increasingly evident that its goal was not being achieved, more specifically in the field of medical history. Thus, in 1948, when the Deutsche Vereinigung für Geschichte der Medizin, Naturwissenschaft und Technik was organized it undertook to deal with a twofold problem. On the one hand, it was necessary to bring to the attention of German scholars the literature that had appeared during the war years and the post-war period; on the other, to make the bibliographical coverage more comprehensive. The publishing house of Urban and Schwarzenberg agreed to issue a bibliographical periodical, and it was decided that the first volume would cover the period 1945-1948.

Volume I of the new *Index zur Geschichte der Medizin, Naturwissenschaft und Technik* appeared in 1953, and with its publication it became evident that an important tool had been added to the armamentarium of

the historians of medicine, science, and technology. Some idea of its comprehensive character is apparent from the following statistics. This volume lists 7,022 papers and books on the history of medicine, 182 on the history of dentistry, 374 on pharmaceutical history, 2,293 on the physical sciences and technology, and 751 on the history of biology. For the present, the history of veterinary medicine has been omitted. It is interesting to note that the three years covered by this bibliography saw the publication of almost as many papers and books on medical history as Julius Pagel had listed for the 22 years from 1875 to 1896.

The first volume of the *Index* contains three papers in addition to the bibliography. These are a study of the initial letters of the Vesalian *Fabrica* by Robert Herrlinger, a paper by Paul Adolf Kirchvogel on the astronomical clock of Landgraf Wilhelm IV of Hessen, and a documentary analysis of the period which Sertuvuer, the discoverer of morphium, spent in the town of Einbeck.

The major portion of the volume (373 pages) comprises the bibliography. It is divided into two basic sections: one devoted to medical history, including dentistry and pharmacy; the other to the natural sciences, technology, and biology. The subject of medicine is divided into sixteen sections as follows: I. Biography, II. Literature and Art, III. Bibliography, IV. Medical history, V. Preventive Medicine and Folk-medicine, VI. Antiquity, VII. Jewish Medicine, VIII. Middle Ages, IX. Renaissance, X. Individual Branches of Medicine (e.g. anatomy, physiology, surgery), XI. Diseases, XII. Medicine in Specific Countries, XIII. Medicine—General, XIV. Medical Profession (organization, education), XV. Hospitals and Care of the Sick, XVI. Miscellaneous. Dentistry and pharmacy are not covered as elaborately. In each case the areas covered are the general history of the field, biography, education and organization of the profession, and technical aspects. The natural sciences, technology, and biology are dealt with in sections devoted to general topics, biographies, periods, geographical areas, and specific branches of a subject.

Within the sections the arrangement is alphabetical. The Index is cross-referenced by sections and is simple to use. The editors and compilers of this useful bibliographical tool are to be congratulated on the manner in which they have dealt with a very difficult undertaking. One looks forward to future volumes of the *Index*.

Sir Zachary Cope. *The History of St. Mary's Hospital Medical School, or a Century of Medical Education.* London, William Heinemann, Ltd., 1954. x, 256 pp. 25/.

Reviewed by A. St. G. Huggett, *St. Mary's Hospital Medical School, University of London, London, England.*

In this volume, published in the centenary year of the School, Sir Zachary Cope has performed a labour of love for his alma mater. Naturally the book

will have its greatest appeal to the alumni of St. Mary's; nevertheless, the century spans the most important period of medical education and so will have a widespread interest to students of the history of medicine. Many of the founders of the School were trained under the old apprentice system, others in the older schools, notably St. George's Hospital Medical School out of which St. Mary's can be said to have evolved by a process of "budding" which took it across Hyde Park to Paddington. The century includes the growth of the private schools into incorporated institutions, the joining of membership of the Royal College of Surgeons with the licentiateship of the Society of Apothecaries as necessary diplomata to practise both surgery and medicine, the formation later of the Conjoint Diploma of M.R.C.S. and L.R.C.P., the rise to dominance of the University degree, and establishment of the Medical Register by Act of Parliament. During most of the period the London medical schools were departments or closely controlled by hospitals which were themselves established primarily for treatment of the sick. Education and research represented additions to the income of the penurious or hobbies of the eccentrics or altruists. In 1948 they were all disestablished as hospital departments and established as separate legal entities working independently of the National Health Service but in close association with their parent hospital and empowered to develop medical education and research in medicine at the university postgraduate level. This last change which followed the publication of the Report of the Committee of the Ministry of Health known as the Goodenough Report from its Chairman, Sir William Goodenough, marked the end of the century covered.

The first eighty pages describe the foundation and development of the School under its various deans and pay due and proper credit to the great deanship of Lord Moran which occupied a quarter of the life of the School. The next forty pages describe the evolution of specialism in teaching at the different levels of medical education. In this is well brought out the character of the school which is so striking, namely, the implementation of that doctrine of Lord Moran that the making of good doctors is best accomplished by weaving their training of two yarns, one of didactic teaching and one of the development of character and leadership on a foundation of wide interests aided by students activities including sport, music, and other cultural aspects. It brings out well the part played by Waller in discovering the electrocardiogram, of Almroth Wright in developing therapeutic inoculations, and of Fleming in initiating the era of antibiotics with his discovery of penicillin. The remainder of the book is largely biographcal and factual and will make its appeal to a more limited readership.

Naturally, one is impressed by the more distant periods concerning which one knows least and tends to be more critical of the more recent periods in which the fermentation of the organism is within one's own knowledge. One would have liked to see a greater consideration of the effects of World War II, in which St. Mary's was the only school of medicine

remaining in London throughout and after the blitz, and also a fuller account of the philosophy of the National Health Service and of the establishment of the independent school and of the undoubted benefits which have accrued to the patient and to medical research and education from these new ventures. Nevertheless, it is a most readable and interesting account of a great school and its influence in the world.

Sir ZACHARY COPE. *William Cheselden, 1688-1752.* Edinburgh, Livingstone, 1953. viii, 112 pp. 14 pl. $4.50.

Reviewed by LLOYD G. STEVENSON, *Associate Professor of the History of Medicine, McGill University, Montreal.*

This is one of the best books in the Livingstone series of medical biographies. Sir Zachary Cope, whose contributions to the history of medicine have happily become numerous, delivered the Vicary Lecture at the Royal College of Surgeons in October 1952, choosing Cheselden as his subject; but the material he had gathered could not be compressed within the bounds of a lecture and has found place in this short but rewarding volume. Much new information, chiefly biographical, has been discovered by Sir Zachary, and this he combines with an informal appraisal of Cheselden's work as anatomist, lithotomist, ophthalmological and general surgeon, teacher, writer, architect, and hospital administrator.

As "the first regular and established teacher of anatomy in London," did Cheselden permit his pupils to do dissections themselves? The answer may be found in his syllabus, but since it is a syllabus of lectures, this is unlikely; later advertisements say that such-and-such things *are shown,* presumably in demonstration lectures. This is a point which might have been made clear, one way or the other, for it was the distinction of the eighteenth-century schools of anatomy that they handed the scalpel to the student.

A few unanswered questions will occur to every reader, but the author is to be congratulated on the number of queries to which replies are found here for the first time. Nothing strikingly new emerges, perhaps, but it is very well demonstrated that the anatomical tradition of English surgery was firmly established quite early in the century, that "scientific" surgery was not created *de novo* by the Hunters (any more than science itself was created by Galileo), and that surgery had become, in its best exemplars, a respectable profession under Queen Anne and the first two Georges.

Cheselden's contribution to these developments was important, and well worth this closer study. His celebrated work as lithotomist, his pioneer operations for strangulated hernia and for the creation of an artificial pupil, these entitle him to be known to every surgeon.

Chapter IX (Separate Incorporation of Surgeons), consisting of extracts from the Journals of the House Commons, is out of place. A portion of the very interesting information it contains should have been incorporated in the previous chapter, on Cheselden's part in bringing the new era to birth,

and the rest of it relegated to an appendix. In a biography it forms an excrescence—or perhaps an umbilical hernia—which calls for surgical intervention.

The last word is the same as the first. This is a good book and deserves to be widely read.

Io. Tortellii *De Medicina et Medicis,* Io. Iac. Bartholoti *De Antiquitate Medicinae;* Giovanni Tortelli, *On Medicine and Physicians,* Gian Giacomo Bartolotti, *On the Antiquity of Medicine,* Two Histories of Medicine of the XVth Century edited and translated by Dorothy M. Schullian and Luigi Belloni; Giovanni Tortelli, *Della Medicina e dei Medici,* Gian Giacomo Bartolotti, *Dell' Antica Medicina,* Due Storie della Medicina del XV Secolo edite e tradotte da Luigi Belloni e Dorothy M. Schullian. Milano, printed by Industrie Grafiche Italiane Stucchi, 1954. xxxii + xxxii, xxxiii-xliv, 1-226 pp., xi pl.

THIS work, published by the pharmaceutical house of CIBA and presented to the members of the XIVth International Congress of the History of Medicine, reproduces in Latin, English, and Italian the texts of two Renaissance histories of medicine. It is an outgrowth of Dr. Schullian's Garrison Lecture of 1953 before the American Association of the History of Medicine, a venture in international co-operation, and in part a product of the Fulbright program for international exchange of scholars.

The full Latin text of the two histories is preserved in two manuscripts at the Vatican Library. The backgrounds of the respective authors and their purposes in writing were different, with the result that the histories, though they cover the same period, exhibit great diversities in content and in style. To Giovanni Tortelli of Arezzo, long known among students of humanism, goes credit for having written the first, to our present knowledge, independent history of medicine in the western world. Since it is transmitted in Ottobonianus latinus 1863, which is corrected in his hand, in a mutilated manuscript at Leiden, and in a fragment also at the Vatican it commends itself therefore as a landmark in medical historiography. It leaves, however, much to be desired in content and in style, for while it traces the history of medicine from the beginning to Tortelli's own day, it is brief, a mere amplification of an earlier dependent sketch completed probably in 1449 when Tortelli was serving as librarian to Nicholas V, and it is largely plagiarized from Celsus and Pliny. It is addressed in adulatory vein to Simone di Marco Tebaldi, physician to Pope Calixtus III.

By contrast Gian Giacomo Bartolotti of Parma has been an obscure and shadowy figure. Born of a family of physicians, pupil of Antonio Cittadini and Sebastiano dell' Aquila, friend of the prelate Niccolò Maria d'Este and the grammarian Daniele Gaetani of Cremona, he was delivering in the year 1498 at the University of Ferrara a series of extraordinary lec-

tures on the fourth fen of the first book of Avicenna's *Canon*. To these he prefaced his sketch of the history of medicine which is contained, with works of his on the nature of demons, on complexions, and on anatomy, in the autograph manuscript Vaticanus latinus 5376. He was, like his father Pellegrino and his uncle Francesco, a practising physician, and his history was intended to instruct medical students in the achievement of their predecessors. In a series of twenty-three chapters, many of them with several subdivisions, he traces the medical art through its origins in divination and prophecies, in chance acquaintance with herbs and simples, in dreams and magic, in astrology; among the Indians and the Egyptians and the Greeks; as developed by Pythagoras, Democritus, Empedocles, Hippocrates, Aristotle, and Galen; and as represented in Greek, Roman, and even Renaissance times by adherents of the Rational, Empiric, and Methodist sects. The history is amazingly detailed and reveals a wide acquaintance with the literature of medicine from the ancient, mediaeval, and Renaissance periods. Where Tortelli limited himself chiefly to Celsus and Pliny, Bartolotti combed a far wider range of authors for his facts and documented his statements with a precision which calls to mind the footnotes of a modern scholar. Most of his references can be quickly and easily found in modern editions of his authors.

In the years which followed, Bartolotti returned repeatedly to his history and, as new evidence presented itself, inserted additions in the margins and between the lines of Vaticanus latinus 5376. The manuscript betrays indeed, on thorough scanning, not only the working methods of Bartolotti the historian but also valuable details on Bartolotti the physician which are confirmed by information elsewhere. He appears to have had a long and honored career in the city of Venice, to whose Collegio de' Medici Fisici he was appointed prior in 1511 and with whose troops, moving eastward in the interests of her commerce, he traveled as ship's surgeon. A manuscript at Padua, Biblioteca Universitaria 318, mentions *Orazioni* delivered by him, in his capacity as prior, when young physicians were received into the doctorate. Marcianus latinus XIV.123 (4662) contains his translation of Cebes, a note on the miraculous blood of Christ which is the product of his visits to a church in Beirut, and various pieces connected with Ferrara or Venice or the East which carry subscriptions attesting his activity in their compilation. The miscellany Vaticanus latinus 5370 transmits many prescriptions and observations which were added in his hand, including a note on a battle between a spider and a toad which was witnessed by a Venetian friend of his in 1528. This and other manuscripts in his possession may have reached the Vatican from the library of Aldo Manuzio the Younger. The latest certain date furnished by these documents for his presence in Venice is 1530, for which year he records the extraction of one of his upper molars.

This evidence on the life of Bartolotti is presented by the editors in their Introduction with the distinct hope that new facts will eventually

come to light. The Introduction is printed in English and Italian on facing pages and is provided with bibliographical notes and quotations from the sources. Text and English and Italian translations of the histories of Tortelli and Bartolotti follow, together with a critical apparatus for the Latin, tables of sources, and an index of proper names. The edition is provided with eleven plates, the majority reproducing representative folios from the manuscripts; with an introductory vignette of Aesculapius performing a healing; with eight title vignettes from coins depicting phases of the career and cult of Aesculapius; and with a cover illustration, from a vase at the British Museum, of Peleus presenting the infant Achilles to Chiron for training in medicine and other arts. Drs. Belloni and Schullian are to be congratulated on this notable and beautifully edited and translated contribution to our knowledge of medical historiography.

J. S. SIMMONS, T. F. WHAYNE, J. W. ANDERSON, H. M. HORACK, and R. A. THOMAS. *Global Epidemiology. A Geography of Disease and Sanitation.* Vol. III. The Near and Middle East. Philadelphia, J. B. Lippincott Co., 1954. 357 pp. $12.00.

Reviewed by JOHN R. PAUL, *Professor of Preventive Medicine, Yale University School of Medicine.*

THIS book is the third in a series of volumes representing a great work started during World War II under the aegis of the senior author—the late General J. S. Simmons. It represents the best available compilation of data in book form dealing with geographical or world medicine which has appeared since the days of August Hirsch whose *Handbuch der historisch-geographischen Pathologie* was published in Germany almost one hundred years ago. The words "compilation of data" are used advisedly because, although there are small maps in this volume, there is but a limited attempt to present the data in cartographic form; and it is reasonable to believe that the authors had in mind that the subject matter of this book could or should be supplemented by an Atlas or Atlases of Geographical Medicine, such as those which have recently appeared or are being prepared under German and also under American editorship. As for the compiling of epidemiological data, Hirsch's work probably encompassed the greater part of written information extant in his time. But the task of writing a treatise on geographical medicine today to cover the world is frightening indeed when one considers the vast amount of data on geographical medicine now available which are being collected and stored in widely scattered areas—and which, if brought together in a row of filing cases, would certainly stretch for miles. However, this did not deter the authors from going forward with the post-war idea of a "global epidemiology" series. As originally stated, it was conceived as a project in "medical intelligence" within the Preventive Medicine Service of the Surgeon General's Office of the U.S. Army during

World War II, and under such auspices Volume I appeared in 1944. The subject was far greater, however, than that of "medical intelligence," and so it was not given up when World War II was terminated. To the credit of the authors, their determination and their labors were not brought to an end when some of them doffed their uniforms in the post-war years.

Volume I dealt with *India, the Far East and the Pacific Islands;* Volume II, which appeared in 1951, with *Africa and the adjacent Islands;* and now Volume III with the *Near and Middle East.* In this most recent addition it has been possible to deal with its 17 countries or areas more thoroughly than in the first volume, for, although some of the Middle Eastern areas have yielded only the scantiest of medical data, the average number of pages per country is about 20 in the Near and Middle East volume, as compared with 15 pages per country in the first volume. Another difference, probably not possible in 1943-44, is that one of the authors was able to visit personally and see for herself the situations in most of the countries listed. It is of some interest that on this list are strange countries and areas in Arabia which must represent the new geography. Yemen is familiar—but Kuwait, Muscat and Oman, and Qatar have a certain unfamiliar ring.

The most complete chapters deal with the physical geography and climate of a given area, its population and socio-economic conditions, environment and sanitation, flora and fauna, health services and medical facilities, and the prevalence of certain diseases. When one considers what these headings encompass, few would deny that the task which has confronted these five authors, both in wartime and at present, was and is beyond the scope of such a small group. Yet they have dealt with it in perhaps the only practical manner which would seem possible at present, namely, the brief listing of available information without critical comment and with limited evaluation from what might be called specialist authors. The information for this volume has been gleaned from: Ministries of Health and other agencies, such as the World Health Organiation, the United States Technical Co-operation Administration Services in Iran, Iraq, and Jordan, the Near East Foundation in Syria, the Rockfeller Foundation, the American University of Beirut, the Hebrew University in Israel, the U.S. Naval Research University, No. 3—Cairo, Egypt, and several oil companies operating in the Persian Gulf area. This is a formidable source of information yielding far more than has been available before, but still limited. At least, according to the reviewer's concept of the situation, the only complete fashion of recording and interpreting global epidemiology today would be to engage some fifty specialists or more to develop the story of their own special diseases or points of view in each of the different areas. The problem of tuberculosis, for instance, in these various countries should perhaps be treated by one thoroughly familiar with the epidemiology of tuberculosis and with modern care of patients with tuberculosis. The question of hospital facilities should likewise presumably be treated by an individual

whose experience in hospital management was of a special and broad type, and so forth. The work of this army of specialists would be expensive and would result, no doubt, in a work which would require an immense amount of editing and might run into 25 volumes or more. This is not the place for the reviewer to suggest that such a monumental task be started, for it is more practical that we should be satisfied and thankful that the limited work is at hand and is as it is.

Concerning the accounts of the medical characteristics of the particular geographical area in question, namely, the Near and Middle East, the authors have brought out a number of interesting points. Here is a part of the world in which during the past generation the concept of public health has not been dominant, in which diseases have been poorly reported, and environmental sanitation has been at low levels, and where infant mortality rates have been thought to be among the highest in the world. During the post-war period, or as the book was being written, there has been a great stirring of the waters in these areas, calling for improvements in sanitation in which some of the instigating agencies have already been listed above. One should not try to grade the countries on their progress or their standards, but one cannot be indifferent to the great strides made by the little country of Israel, and perhaps Lebanon, in this part of the world. They stand in contrast to their surrounding nations.

One of the criticisms which one might raise would be concerned with the fact that in a number of these countries "hidden diseases" exist which are actually a menace to visitors from western Europe and the United States. Local Ministries of Health are often quite unaware of their existence for the simple reason that as far as their own local native population is concerned, these diseases escape recognition, diagnosis, and reporting. For instance, infectious hepatitis, which is a potential menace to visitors from the United States or western Europe to such countries, is scarcely mentioned. In five of 17 countries, or areas, only two printed lines are devoted to this subject; in another five there are not more than half a dozen lines. An exception to this, however, is the report from Israel where there has been concern over the presence of viral hepatitis. Here its problems occupy a paragraph or two. Similarly, sandfly fever, notoriously well known to U.S. and British soldiers quartered in this part of the world, is mentioned in almost all of the countries or areas, but mentioned extremely briefly. In Iran, for example, where U.S. and British troops during World War II were subject to very extensive epidemics of sandfly fever, this disease is dismissed with two lines, stating that it is endemic, particularly in the northern and central provinces. These are things which subsequent books on geographical medicine should attempt to dig out. For within these countries such diseases as poliomyelitis and others just mentioned above lie buried under the fact that their reported, local incidence appears to be insignificant as far as the local population is concerned. It may be superfluous to add that

the viruses of these hidden diseases still thrive locally, taking their annual and unrecorded toll of the younger members of the native population and awaiting the virgin soil of any group of susceptible immigrants who chance that way.

The volume under review and its two earlier companion volumes should be on the shelves of all medical school libraries and within reach of teachers of epidemiology whether they are globally minded or not.

ILZA VEITH, Editor. *Perspectives in Physiology. An International Symposium, 1953.* Washington, D. C., American Physiological Society, 1954. xi, 171 pp. $3.00.

Reviewed by the Editor.

WRITING as a physiologist who was prevented from attending this stimulating Symposium, held in association with the Nineteenth International Physiological Congress at Montreal in 1953, I doubly regret my absence after reading this timely record of the various presentations. Dr. Ilza Veith, Assistant Professor of the History of Medicine at the University of Chicago, who has acted as general editor, gives a thoughtful historical introduction in which the growth of physiology as a separate discipline is briefly traced. She points out that it was Hermann Boerhaave's lectures on the institutes of medicine at Leyden that created physiology as a separate academic discipline, and that students from all over Europe, especially from Scotland, carried his teachings to other university centers and eventually to the American colonies. Dr. Veith also discusses the growth of the international physiological congresses.

In the space of a brief review it would be impossible to summarize the various presentations. Perhaps the most challenging is that of Professor Adrian, Master of Trinity College, Cambridge, and President of the Royal Society. Taking a long view, he remarks, "Whatever else it may do, I think this Symposium ought to make interesting reading 50 or even 100 years hence. Any one then who could look at the record of what we are going to say would certainly be cheered by finding out how many of our predictions have missed the mark." Alexander von Muralt of Bern spoke on the "Development and Limitations of Physiological Research" in which he concludes that a physiologist ". . . must have the analytical mind of an engineer and at the same time the skilled hand of an artisan. In addition to all this he should have the creative vision of an artist and the modesty of an eremite. Where is this ideal person? He can be found only in our imagination, and that is the reason we are all so devoted to physiology." Other contributors are Best, Bykov, Homer Smith, Gerard, and various prominent physiologists from all over the world.

CATHERINE M. CLARK and JAMES M. MACKINTOSH. *The School and the Site. A Historical Memoir to Celebrate the Twenty-fifth Anniversary of the School.* [London School of Hygiene and Tropical Medicine—University of London.] London, H. K. Lewis, 1954. 105 pp., illus. 21s.

Reviewed by the Editor.

DESPITE the unforgivable sin of not indicating in the title what school and what site are being dealt with in the volume, Miss Clark and Dr. Mackintosh give us a most engaging account of the origins of the London School of Hygiene and Tropical Medicine.

Those who know London will be particularly interested in the historical account of that area on and off Keppel Street where the University of London now stands and where the London School of Tropical Medicine is also situated. The account runs, "In the reign of Henry III, one William Blemund was the lord of this manor. His name appears as such in several of the deeds appertaining to the hospital at that period, and it generally appeared as 'Blemund's Land' . . . The name of the place has gradually become modified and changed into Blemundsbury, and finally Bloomsbury."

The volume is well illustrated and carries the story through successive occupancy at Malet, Keppel, and Gower Streets, and to the period of restoration (1947-1952) following the bomb damage of the war. A sentence from an early Annual Report summarizes the spirit of the place: "Our success will be measured primarily by the quality of our teaching and our research work as a University institution, but also by the readiness with which our doors are thrown open to enquirers from all parts of the world in the field of hygiene and tropical medicine."

DONALD FLEMING. *Science and Technology in Providence 1760-1914: An Essay in the History of Brown University in the Metropolitan Community.* Brown University Papers, XXVI. Providence, Brown University, 1952. 54 pp., illus. $1.25.

Reviewed by JOHN B. BLAKE, *Fellow in the History of Medicine, Yale University School of Medicine.*

In this brief essay on the relations between Brown University and Providence in the realms of science and technology, Donald Fleming has pointed out that from its beginning the college gave the sciences "an honorable, if limited" place in the curriculum. In so doing, Brown conformed to the spirit of the age and of the place, for leading citizens of Providence, like other Americans, had demonstrated their keen interest in scientific endeavor at the time of the transit of Venus in 1769. More definite attempts to relate the college to the scientific and technological needs of the local community were the founding of a medical school in 1811, and a series of educational reforms introduced in 1850. Though both these innovations proved unsuccessful, instruction in the sciences gradually expanded from

the 1860's on, particularly after the addition of training for graduate degrees in 1887, and among her professors Brown has boasted not a few eminent scholars. Appointment of such men, together with the failure of the university extension courses instituted in 1890, signified by the early twentieth century that in science Brown sought to serve first the community of learning, second the nation, and Providence last of all.

Fleming's remarks on the sad story of medicine at Brown will be of particular interest to readers of this *Journal*. Founded in 1811, the medical school during its brief life span introduced instruction in chemistry to Brown; it produced Elisha Bartlett (Osler's "Rhode Island Philosopher"); and it offered an unusual opportunity for a mutually beneficial relationship between the college and the city. The loss to both resulting from Francis Wayland's off-hand destruction of the school in 1827 is particularly well illustrated by the career of Charles V. Chapin, who was, Fleming writes, "perhaps the most important, and probably the most useful, of all the graduates of Brown University." Professor of physiology at the University for a number of years, Chapin gained his world-wide reputation as the health officer of Providence from 1884 to 1931. By precept and example he did as much as any American to base public health administration on the science of bacteriology. But although Chapin bound together the life of the University and of learning to the life of the community, the full benefit of this relationship, created by one great man, could only have been permanently secured by the institution of a university school of public hygiene, a consummation long since blocked by President Wayland's action.

By examining these significant details, this well told and thoughtful account of certain segments of local history illumines larger aspects of scientific and educational history.

ALEXANDER MONRO, *primus*. [An autobiography.] H. D. Erlam, Editor. *Edinburgh University Journal*, 1954, Summer Number, pp. 77-105. Frontispiece engraving of Alexander Monro by Allan Ramsay the Younger (1717-1784).

Reviewed by the Editor.

MR. Erlam records that the Library at the Medical School of Otago possesses not only the Monro collection of books and manuscripts but a forty-six page manuscript inscribed on the fly-leaf, "Life of Dr. Ar. Monro Sr. in his own handwriting." The text of this interesting document has now been made available in full, and it gives a clear indication of how the Monro dynasty in Edinburgh anatomy became established. Alexander Monro *primus* occupied the Professorship from 1720 until his death in 1767, and the two succeeding Monros continued until 1846 so that the Monros held the chair successively for 126 years. The story is an extraordinary one and it seems highly appropriate that it should come from New Zealand which, like Pennsylvania, is one of the great outposts of Scottish medicine.

The text is all written in the third person, and in a recent address on the Monros, Dr. Douglas Guthrie of Edinburgh discussed the question of whether the manuscript was actually written by Alexander Monro *primus*, but concluded that the Scots, being a formal race of men, would prefer to use this medium rather than describe their life in the first person. It is Dr. Guthrie's feeling that the manuscript is undoubtedly authentic and that it could have been written by no other than Alexander *primus* himself.

ANGELUS POLITIANUS, *Sylva in Scabiem*, testo inedito a cura di Alessandro Perosa (*Note e Discussioni Erudite* a cura di Augusto Campana, 4). Roma, Edizioni di Storia e Letteratura, Via Lancellotti 18, 1954. 64 pp.

Reviewed by DOROTHY M. SCHULLIAN, *Curator of Rare Books, Armed Forces Medical Library, Cleveland, Ohio.*

IN celebration of the five hundredth anniversary of the birth of Politian the Laurentian Library held, in the autumn of 1954, an exhibit of manuscripts, documents, and early printed books relating to the great humanist. Item no. 100 in this exhibit was a fifteenth century manuscript miscellany, Palatinus 555, which had been borrowed for the occasion from the Biblioteca Governativa at Parma. It was open at p. 681, at the beginning, that is, of Politian's poem on the scabies which is published for the first time in the edition here reviewed.

The medical interests of Politian are becoming increasingly well known to medical historians, largely, and quite naturally and fittingly, through the efforts of humanistic scholars. This poem on the scabies is a case in point. It was brought to the notice of Alessandro Perosa of Pisa by Paul Oskar Kristeller of Columbia University. Consisting of three hundred and fifty-eight hexameters and clearly modeled after Statius and other classical authors, it relates the symptoms and course of a disease which is named only in the title, a disease which, though never fatal, makes of its victim a living corpse and from which the author in desperation finally requests relief from Lorenzo de' Medici. The editor sets forth at the outset that Politian had no truly scientific purpose in writing the poem: nonetheless the stark realism, for example, in the description of the effects of the disease and, by contrast, the *excursus* on its fanciful parasite place it at once in the field of medical history and give cause for regret that the true nature of the scabies was discovered, also in Politian's Tuscany, by Bonomo and Cestoni only after two centuries, when the principle of *omne animal ex ovo* had been formulated by Harvey, the theory of spontaneous generation refuted, and the concept of parasitism definitely formulated by Redi, and the study of micro-organisms advanced by van Leeuwenhoek. On the other side, the poem calls to mind inevitably the mass of verse, in Sapphic and other meters, in Latin and in the vernaculars, in part tragically serious and in part jesting and satiric, which a few decades later accompanied the spread of syphilis in Europe.

In a careful introduction the editor traces the history of his manuscript, dates the poem from internal evidence between the summer of 1475 and the spring of 1478, and lists the criteria of his edition. The poem is indeed edited in accordance with the best traditions of classical scholarship and text criticism, and it is furnished with a helpful commentary in which are quoted in particular the various parallels from classical authors which Politian adapted with an immense facility to his own use. In an Appendix the editor prints from the same manuscript five lines written by Politian in friendship to Giovanni Pico della Mirandola, and from Laurentianus Ashb. 1703 an anonymous elegy on the scabies, sixty lines in length, from about the same period. An index of names at the end includes also the proper adjectives which are not capitalized in the text itself.

Scholars have cause to be grateful to the publisher Monsignor Giuseppe de Luca and the general editor Augusto Campana that so important a contribution, too short by the usual standards for a book and too long for an article, is made known through their series. The edition was deservedly exhibited in the fall of 1954, with sixty significant editions of Politian's works from the year 1533 on, in his native town of Montepulciano.

Art in Science. A portfolio of 32 paintings, drawings and photographs from *Scientific American.* New York, Simon and Schuster, 1954. $6.00.

Reviewed by the Editor.

THIS beautifully illustrated portfolio brings to the fore the important interrelations between the arts and the sciences and the fact that each is benefited by the other to the degree in which mutual co-operation obtains. Some scientists, and some men of medicine, have been artists in their own right, and they have used their artistic talent not only in their writings but for the purpose of illustrating their books and papers. The late Harvey Cushing was an eminent example of one who had gifts in both directions. The recent exhibition at the Wadsworth Atheneum in Hartford and that at Milwaukee, both having to do with medicine and art, provided many other examples of this theme.

SARAH AUGUSTA DICKSON. *Panacea or Precious Bane. Tobacco in Sixteenth Century Literature.* New York, The New York Public Library, 1954. Publication No. 5, Arents Tobacco Collection.) xiv, 227 pp.

Reviewed by the Editor.

THIS attractively printed book of most excellent and sophisticated type design, dedicated to George Arents, has as its frontispiece a collotype portrait of Damiao de Goes, the eminent Portuguese humanist, who first called tobacco the "holy herb." It is a portrait executed by Albrecht Dürer, the original of which is in the Albertina Museum, Vienna. The first chapter begins with this significant sentence: "Tobacco is American, and it is a

sign and a portent that the first account of it in a printed book should have been written by the man for whom America was named, Amerigo Vespucci." The text continues:

It is a fascinating fact in the literary history of the "witching weed," always a subject of violent controversy, that the author of this interesting passage should himself be one of the most controversial personages in American annals.

The Florentine navigator was not the first European to observe the use of tobacco in the New World. Two sailors of Columbus saw Indians smoking in 1492, and the discoverer of America recorded this fact in his journal, but no part of this was published until many years later. Vespucci, on his second voyage in 1499, with Alonzo de Hojeda and Juan de la Cosa, saw Indians chewing a "green herb" on the Island of Margarita, off the coast of Venezuela. This he relates in his *Lettera di Amerigo Vespucci delle isole nuovamente trouate in quattro suoi viaggi,* Florence, circa 1505, the first edition of his four voyages.

The volume is a notable one because of its extensive and accurate documentation and quotations; it will be of the greatest interest to all smokers as it will to non-smoking medical historians.

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